

Founded in 1832

RAILWAY LOCOMOTIVES AND CARS

JULY 1954

FOR OFFICERS AND SUPERVISORS RESPONSIBLE FOR DESIGN, CONSTRUCTION AND MAINTENANCE OF MOTIVE POWER AND ROLLING STOCK

formerly

RAILWAY
Mechanical and
Electrical Engineer

P-S Stainless-Steel
Passenger Coach

■

What's New in
Locomotive Wiring

■

Motor Lead Switch
Saves Time and
Trouble

■

Western Pacific
Flat Cars

■

Dismantling Diesel
Trucks at Proviso

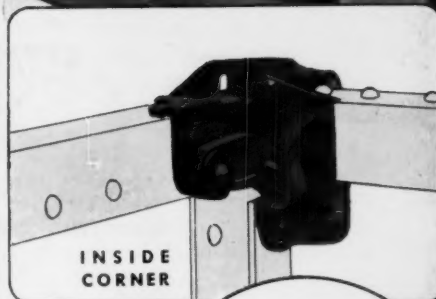
■

Shop Ideas
For Diesel Repairs

■

Beginning Two New
Series: Questions &
Answers—GM & FM
Locomotives

INTERLOCKED —all ways!



DROP END LOCKS

KEEP CORNERS FROM SPREADING • WON'T ACCIDENTLY OPEN

THE WINE RAILWAY APPLIANCE CO. TOLEDO 9, OHIO



One of a series of messages to shippers sponsored by Buffalo Brake Beam Company — Unit Truck Corporation in behalf of railroad-motor truck coordinated service.

Pardon us for mixing business with pleasure!

Statistics show that we Americans spend more time in our automobiles than we do in our living rooms!

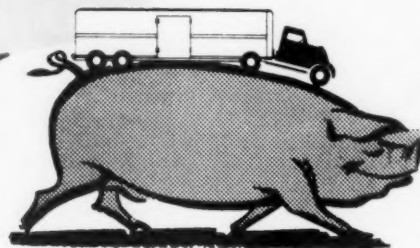
If you haven't already heard about it, the railroads are working on a new idea that is going to make personal transportation a lot safer and more pleasurable.

Piggy-back—the railroads' name for the terminal-to-terminal hauling of truck trailers by rail, has already proven itself under actual operating conditions. Today — the American railroads are teamed up with some of

industry's greatest names in a rapidly expanding program to make Piggy-back available to shippers everywhere.

By reducing the volume of intercity truck movements, Piggy-back will prove a boon to all of us who use our highways for business or pleasure. But for you, Mr. Traffic Manager, this happy merger of the best in rail and truck transport offers a double benefit—faster and more dependable handling of your shipments regardless of highway traffic density or road and weather conditions—plus more fun and safety for your family on the open road.

BUFFALO BRAKE BEAM COMPANY • UNIT TRUCK CORPORATION
NEW YORK • BUFFALO HAMILTON, ONT.
FREIGHT CAR BRAKE RIGGING FOR HALF A CENTURY



UNIT TRUCK

— standard on 4 out of every 5 new freight cars built last year—will implement the new era in transportation opened up by PIGGYBACK. No system of freight car brake rigging can approach Unit in safety—dependability—operating economy.

UNIT TRUCK CORPORATION
NEW YORK

It pays to buy
cleaning compounds
on a **RESULTS** basis...

YOU SAVE MONEY THAT WAY

Oakite's Technical Cooperation
assures money-saving results
with...

the **RIGHT MATERIALS**
the **RIGHT METHODS**

FOR EXAMPLE:



...in desludging lube oil coolers

Results—not merely cost per pound or gallon of material—determine your road's cleaning costs. Real results mean accomplishing what you set out to do—namely, getting whatever you want to clean *really* clean, in the shortest time, and with minimum work.

You can be sure you're doing exactly that when you clean Diesel lube oil coolers the Oakite Steam-Surge way. Developed in cooperation with a Class 1 road, this method effectively banishes oil sludge deposited on cooling surfaces and baffles.

It restores to coolers their heat transfer efficiency with new thoroughness, new speed—and new economy. And oft times you can do it with coolers **IN PLACE**.

That's what we mean when we say you can find more savings in results than in cost of material. Why not make certain of the finest cleaning results for *your* shop? Contact your local Oakite Man for his technical help. You'll find he has wide experience in dealing with any railroad cleaning problem.

This booklet can help you save money for your road.

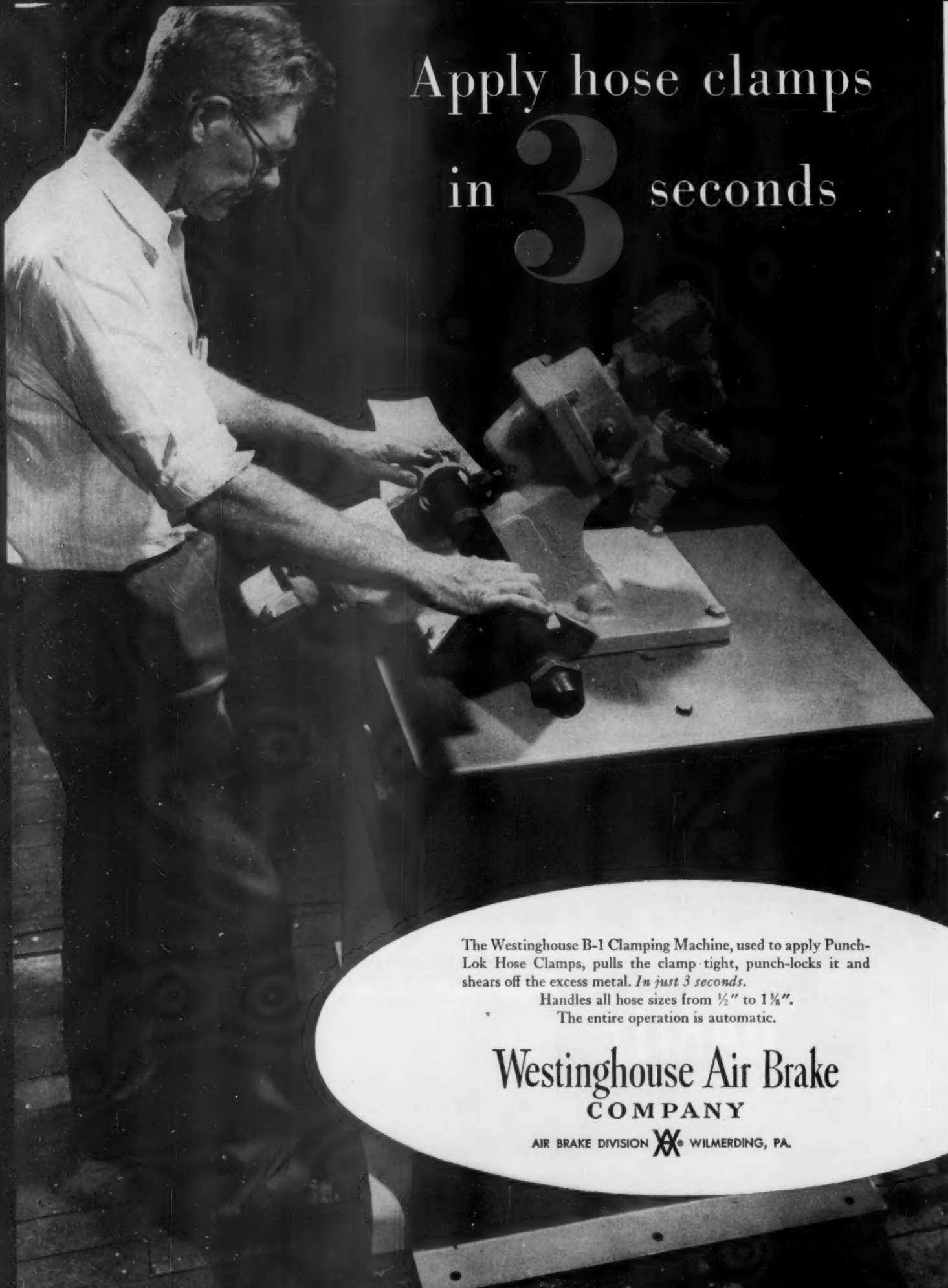
Free 56-page Oakite bulletin is chock-full of ideas for maintenance cleaning—including semi-automatic cleaning of running gear, filter cleaning, manual and mechanical coach washing. Send for your copy today to...



OAKITE PRODUCTS, INC., 46 Rector Street, New York 6, N. Y.
Oakite Products of Canada, Ltd., 65 Front Street East, Toronto, Ont.

OAKITE

RAILWAY DIVISION




Apply hose clamps in 3 seconds

The Westinghouse B-1 Clamping Machine, used to apply Punch-Lok Hose Clamps, pulls the clamp tight, punch-locks it and shears off the excess metal. *In just 3 seconds.*

Handles all hose sizes from $\frac{1}{2}$ " to $1\frac{1}{8}$ ".

The entire operation is automatic.

**Westinghouse Air Brake
COMPANY**

AIR BRAKE DIVISION  WILMERDING, PA.

July, 1954

VOLUME 128

No. 7

RAILWAY LOCOMOTIVES AND CARS

Founded in 1832 as the American Rail-Road Journal.

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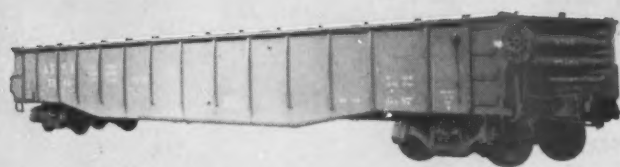
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PRINTED BY PERIODICAL PRESS CORP., PHILA. 23, PA.



23,000 gondola cars have been built



USS HIGH STRENGTH STEEL

better with USS COR-TEN steel since 1934

COR-TEN steel construction prolongs life and reduces maintenance costs

*by its superior ability to resist corrosion
and withstand abuse*

LIFE is hard for the gondola car. No other type of car has to transport such a diversity of heavy and bulky commodities. None is subjected to more severe and destructive service conditions.

For in addition to being constantly exposed to atmospheric corrosion, while carrying minerals of various kinds, or lumber, steel products or machinery, the gondola car also takes a beating every time it is loaded or unloaded.

That is why 24 domestic and 7 foreign railroads have turned to USS COR-TEN steel construction to keep down maintenance expense and to prolong the life of their gondolas. To date 23,000 COR-TEN steel gondolas have been built. More than 4000 of them have been in service from 10 to 16 years.

During that time, COR-TEN steel's ability to improve car performance has been amply demonstrated. These cars have stood up better than cars built of carbon steel. They have cost less for repairs.

Deterioration caused by atmospheric corrosion* has been greatly retarded because COR-TEN steel has 4 to 6

times the atmospheric corrosion resistance of carbon steel—2 to 3 times that of copper steel. And, because COR-TEN steel is 50% stronger than structural carbon steel, has 60% higher endurance limit, and offers greater resistance to distortion and denting, mechanical damage to these COR-TEN steel gondolas has been kept to a minimum.

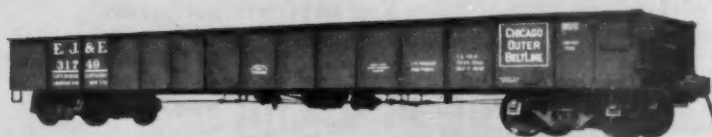
Typical of the railroads capitalizing on these cost-saving advantages of COR-TEN steel construction are the Denver & Rio Grande Western which bought its first lot of 50 COR-TEN steel gondolas in 1939 and now has 4800 in service . . . the Elgin, Joliet and Eastern which started with 200 in 1936 and at present owns 2,000 . . . the Great Northern which bought 500 in 1944 and has added 700 since . . . the Atchison, Topeka & Santa Fe with 500 COR-TEN-built gondolas in service.

These representative roads and others on the long list of users of gondola cars that have been built better with USS COR-TEN can tell you how this tough, strong, corrosion-resisting steel pays off for them. We will be glad to tell you who they are.

*A recent railroad study showed that corrosion is responsible for 58% of the cost of repairs to gondola cars.

UNITED STATES STEEL CORPORATION, PITTSBURGH • AMERICAN STEEL & WIRE DIVISION, CLEVELAND • COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
NATIONAL TUBE DIVISION, PITTSBURGH • TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. • UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

4-1486



UNITED STATES STEEL




with FLAME-HARDENING

Are you taking full advantage of the flame-hardening process in your shops? This list will help you compare the flame-hardening operations that are being done on your railroad with the broad application of this money-saving process in scores of shops following OXWELD procedures. Usually you can adapt existing setups to harden any additional parts.

Write for booklet F-5422 which discusses flame-hardening principles as they apply to railroads. OXWELD representatives will be glad to review your flame-hardening operations with you.

The term "Oxweld" is a registered trade-mark of Union Carbide and Carbon Corporation.

OXWELD RAILROAD SERVICE COMPANY A Division of Union Carbide and Carbon Corporation


Carbide and Carbon Building Chicago and New York
In Canada:
Canadian Railroad Service Company, Limited, Toronto

HERE IS A CHECK-LIST ON FLAME-HARDENING

Locomotive Parts

Articulating Pins
Booster gears
Booster shafts
Brake beam trunnions
Brake rigging pins
Buffer castings
Buffer radial blocks
Buffer wedges
Chafing castings
Cradle pins
Crosshead guides—bar type
Crosshead guides—multiple bearing
Crosshead shoes
Drawbar pins
Driver spring equalizers
Driver spring saddles
Driving box liners
Driving box jaw surfaces
Driving wheel lateral wedges
Equalizers
Equalizer crossbars
Equalizer pins
Floating crosshead guide housing
Knuckle pins
Knuckle pin bushings
Lead truck boxes
Lead truck pedestal jaws
Lead truck rocker bearings
Lead truck rocker castings
Lead truck rocker seats
Lead truck swing bolsters
Links
Link boxes
Pedestal shoes
Pedestal wedges
Piston head ring grooves
Piston valve packing rings
Reversing yokes
Slack adjusting wedges
Spring hangers
Stoker gears
Stoker racks
Stoker screws
Swing hangers
Tender truck journal boxes
Trailer equalizers

Trailer rocker plate
Trailer rocker plate rollers
Trailer truck rocker castings
Truck equalizer pins (electric locomotives)
Valve crossheads
Valve crosshead gibs
Valve crosshead guides
Valve crosshead shoes
Wrist pins

Coach Parts

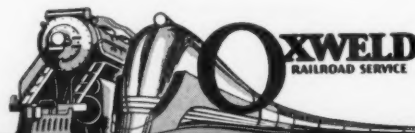
Buffer castings
Buffer stems
Coupler knuckles
Equalizer seat inserts
Generator drive pulleys
Journal box wedges
Journal box wedge seats
Slack adjusters
Spring seats
Truck equalizers
Truck pedestals

Car Parts

Bolster spring seats
Buffer castings
Coupler carrier castings
Coupler knuckles
Coupler lock
Coupler lock lifter
Hopper car door lock
Journal brass wedges
Side bearing parts

Others

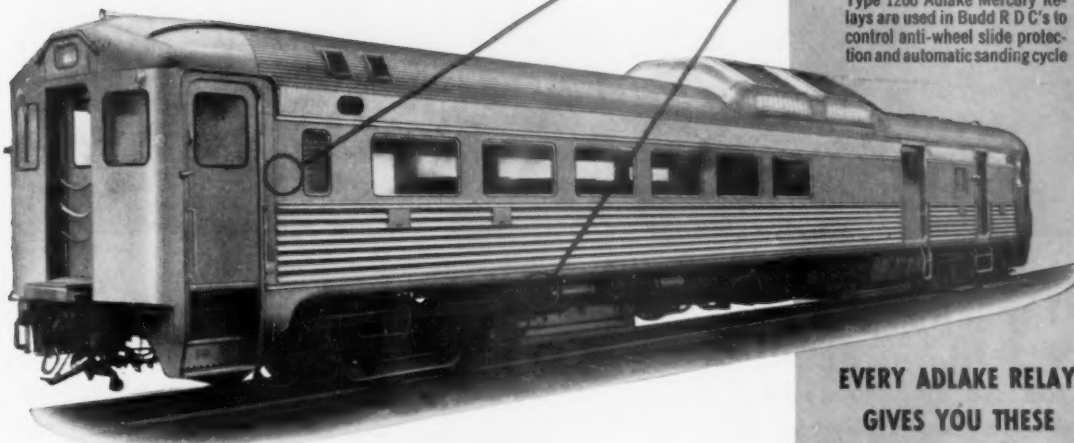
Crane wheels
Derrick bearings
Punch or die blocks
Spring stripper blocks
Tractor traction bearing rolls
Traveling crane pinions
Turntable rollers



SINCE 1912—THE COMPLETE OXY-ACETYLENE SERVICE FOR AMERICAN RAILROADS

Adlake relays "put on the brakes"

in Budd RDC



Type 1200 Adlake Mercury Relays are used in Budd RDC's to control anti-wheel slide protection and automatic sanding cycle

Relays that control brake operation in a railroad car must combine many features...absolute dependability, immunity to shock and vibration, maintenance-free operation, and a hermetic seal that keeps out dust, dirt and moisture. Specifications like that call for ADLAKE Mercury Relays!

What's more, ADLAKE Relays have other valuable features that are often vitally important in different installations. For instance, their time delay characteristics are fixed and non-

adjustable, even under the most adverse conditions of temperature and moisture. Their mercury-to-mercury contact gives them an ideal "snap" action, and they are silent and chatterless.

ADLAKE Relays can play a valuable part in your modernization program. Send for the ADLAKE Relay Catalog today...no obligation, of course. The Adams & Westlake Company, 1152 No. Michigan, Elkhart, Indiana; In Canada, Powerlite Devices, Ltd., of Toronto.

EVERY ADLAKE RELAY GIVES YOU THESE PLUS FEATURES:

Hermetically Sealed
dust, dirt, moisture, oxidation
and temperature changes
can't interfere with operation.

Silent and Chatterless

Requires No Maintenance

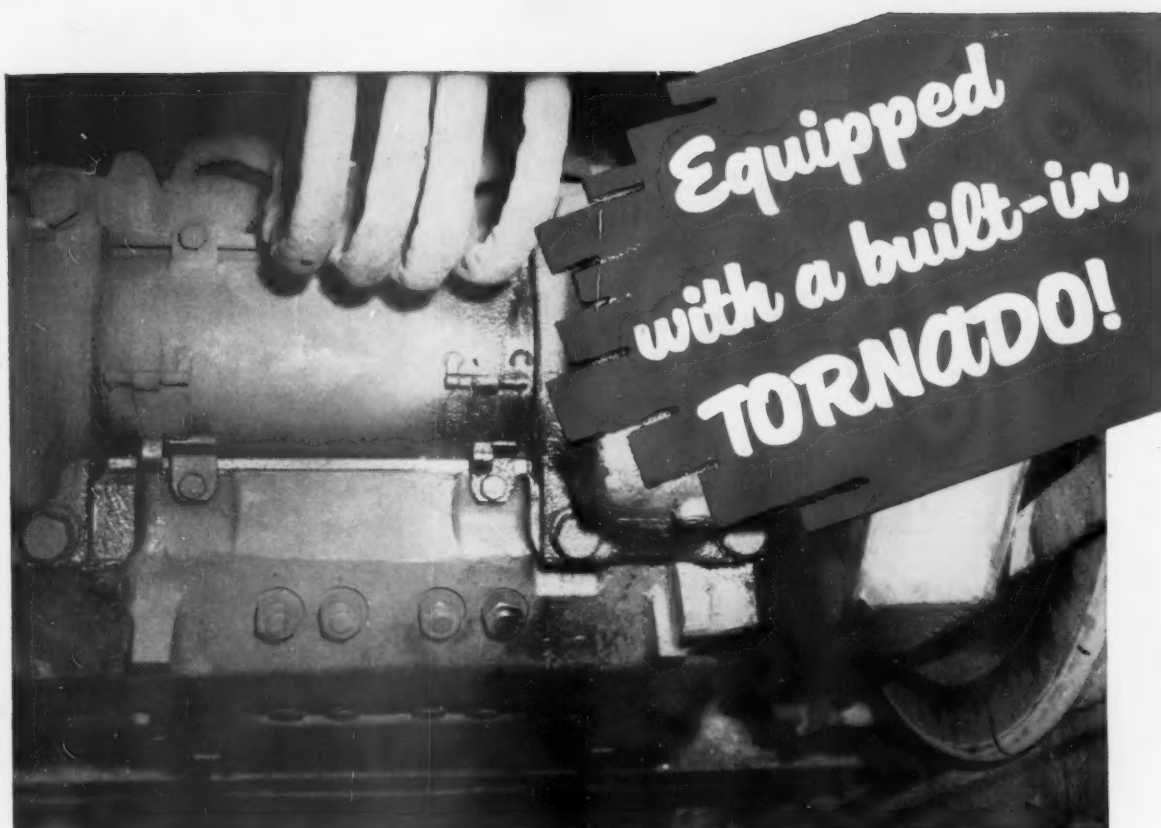
Absolutely Safe

Mercury-to-Mercury Contact
prevents burning, pitting
and sticking.

THE Adams & Westlake COMPANY

Established 1857 • ELKHART, INDIANA • New York • Chicago
Manufacturers of ADLAKE Specialties and Equipment for the Railway Industry





That's the way a traction motor cable might describe a diesel electric locomotive. The cable gets sand, ice crystals, snow, water, dirt and debris blasted at it by train suction. The cable is subject to constant vibration and swaying in extremes of temperature both summer and winter.

No wonder, then, that those concerned with diesel locomotive availability insist on the highest quality cable available. That's why the sales curve for Simplex Diesel Locomotive and

Traction Motor Cable is going up so steeply. The word has gotten around that you can depend on Simplex Cables. They will be in there pitching long after less rugged cables have been replaced.

Simplex Diesel Locomotive Cables are made to keep locomotives on the road earning money, not in the shop being rewired. If you have any doubt about the ability of your present cable to "take it," try Simplex Diesel Locomotive Cables. You will be surprised and pleased with the service you get from them.

Want to know more about these tough, rugged cables? Your Simplex representative will be glad to tell you about them.

Simplex

DIESEL LOCOMOTIVE CABLE

SIMPLEX WIRE & CABLE CO., 79 Sidney Street, Cambridge 39, Massachusetts

NEWS . . .

ICC Prescribes Rules for MU Equipment

The Interstate Commerce Commission has prescribed rules and instructions for the inspection and testing of multiple-unit equipment, i.e., electrically-propelled cars operated by a single set of controls.

The rules which become effective September 1, came out of the commission's Ex Parte No. 179 investigation of the matter. The inquiry was instituted in 1951 after the Brotherhood of Locomotive Engineers and the Brotherhood of Locomotive Firemen & Enginemen had filed petitions asking that present locomotive inspection rules be extended to include multiple-unit equipment.

Fifty-nine rules and five report forms were prescribed in the commission's order which was dated May 18 as was the accompanying report. The latter was a Division 3 report written by Commissioner Clarke.

Previously there had been issued proposed rules—one set in 1952 and revised version last year. Interested unions and railroads submitted presentations with respect to these proposals, and many modifications thus recommended were incorporated in final version, the commission said.

ICC Consolidates Safety and Car Service Functions

Three major sections of the Interstate Commerce Commission—Locomotive Inspection, Railroad Safety, and Car Service—were consolidated on June 1 under the name "Bureau of Safety and Service." The Section of Explosives has also become a part of the Railroad Safety Section. Owen Clarke is the commissioner in charge of the Bureau of Safety and Service.

Charles W. Taylor, formerly director of the Bureau of Car Service, has been appointed acting director of the new Bureau.

S. N. Mills, who was director of the Bureau of Safety, was appointed assistant director in charge of the Section of Railroad Safety. That section now has the functions formerly exercised by the Bureau of Safety. Mr. Mills was also designated to serve as acting director during any absence of Mr. Taylor.

Charles H. Grossman, who was director of the Bureau of Locomotive Inspection, is another assistant director of the new bureau. He has charge of its Section of Locomotive Inspection, which now has the functions formerly exercised by the Bureau of Locomotive Inspection. Meanwhile, Mr. Grossman retains his title of director of locomotive inspection under the Locomotive Inspection Act, which is a Presidential appointment. Full integration of the loco-

motive inspection work into the new bureau must await changes in the Locomotive Inspection Act.

At the time the proposed consolidation was announced, it was stated that the consolidation will cut the number of I.C.C. bureaus to 11; some overlapping and duplication in inspection of railroad facilities, equipment and activities will be eliminated, and the railroads will gain from having a single-bureau to act on safety

and service matters, instead of three bureaus, as formerly.

Charles L. Harrison, who was assistant director of the Bureau of Service, is a third assistant director of the new bureau. He will be in charge of its Section of Car Service. This section has an Explosives Branch which supplements the section of explosives which was in the former Bureau of Service.

(Continued on page 12)

SELECTED MOTIVE POWER AND CAR PERFORMANCE STATISTICS

FREIGHT SERVICE (DATA FROM I.C.C. M-211 AND M-240)

Item No.	Month of March		3 months ended with March	
	1954	1953	1954	1953
3 Road locomotive miles (000) (M-211):				
3-05 Total, steam.....	6,513	12,553	21,085	37,964
3-06 Total, Diesel-electric.....	32,625	31,250	93,101	89,498
3-07 Total, electric.....	669	793	1,906	2,215
3-04 Total, locomotive-miles.....	39,888	44,663	116,317	129,856
4 Car-miles (000,000) (M-211):				
4-03 Loaded, total.....	1,508	1,709	4,369	4,870
4-06 Empty, total.....	886	895	2,571	2,623
6 Gross ton-miles-cars, contents and cabooses (000,000) (M-211):				
6-01 Total in coal-burning steam locomotive trains.....	12,269	21,833	39,779	66,127
6-02 Total in oil-burning steam locomotive trains.....	2,003	5,978	7,127	17,198
6-03 Total in Diesel-electric locomotive trains.....	89,020	87,758	254,299	248,656
6-04 Total in electric locomotive trains.....	2,061	2,212	5,778	6,162
6-06 Total in all trains.....	105,637	118,021	307,753	338,769
10 Averages per train-mile (excluding light trains) (M-211):				
10-01 Locomotive-miles (principal and helper).....	1.02	1.03	1.02	1.03
10-02 Loaded freight car-miles.....	40.40	41.50	40.30	40.70
10-03 Empty freight car-miles.....	23.80	21.70	23.70	21.90
10-04 Total freight car-miles (excluding cabooses).....	64.20	63.20	64.00	62.60
10-05 Gross ton-miles (excluding locomotive and tender).....	2,832	2,862	2,836	2,829
10-06 Net ton-miles.....	1,238	1,291	1,247	1,275
12 Net ton-miles per loaded-car-mile (M-211).....	30.60	31.10	31.00	31.30
13 Car-mile ratios (M-211):				
13-03 Per cent loaded of total freight car-miles.....	63.00	65.60	63.00	65.00
14 Averages per train hour (M-211):				
14-01 Train miles.....	18.90	18.40	18.90	18.30
14-02 Gross ton-miles (excluding locomotive and tender).....	53,090	52,201	152,947	51,313
14 Car-miles per freight car day (M-240):				
14-01 Serviceable.....	41.40	45.10	41.40	44.70
14-02 All.....	39.30	43.00	39.30	42.60
15 Average net ton-miles per freight car-day (M-240).....	758	879	767	808
17 Per cent of home cars of total freight cars on the line (M-240).....	54.90	47.30	54.10	47.30

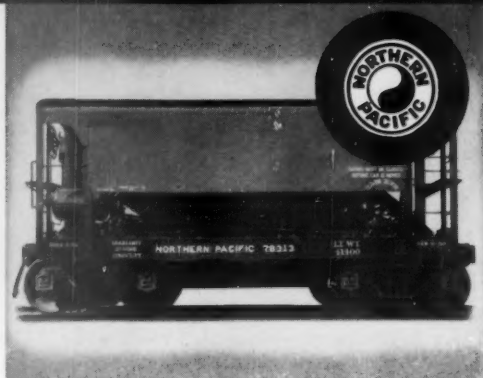
PASSENGER SERVICE (DATA FROM I.C.C. M-213)

3 Road motive-power miles (000):				
3-05 Steam.....	2,554	4,647	7,889	14,522
3-06 Diesel-electric.....	21,214	20,421	61,623	58,954
3-07 Electric.....	1,443	1,606	4,263	4,724
3-04 Total.....	25,213	26,674	73,775	78,201
4 Passenger-train car-miles (000):				
4-08 Total in all locomotive-propelled trains.....	250,158	267,553	736,123	786,309
4-09 Total in coal-burning steam locomotive trains.....	13,163	27,282	40,952	81,965
4-10 Total in oil-burning steam locomotive trains.....	7,812	13,610	24,095	46,009
4-11 Total in Diesel-electric locomotive trains.....	212,995	208,699	623,348	605,299
12 Total car-miles per train-mile.....	9.54	9.71	9.61	9.76

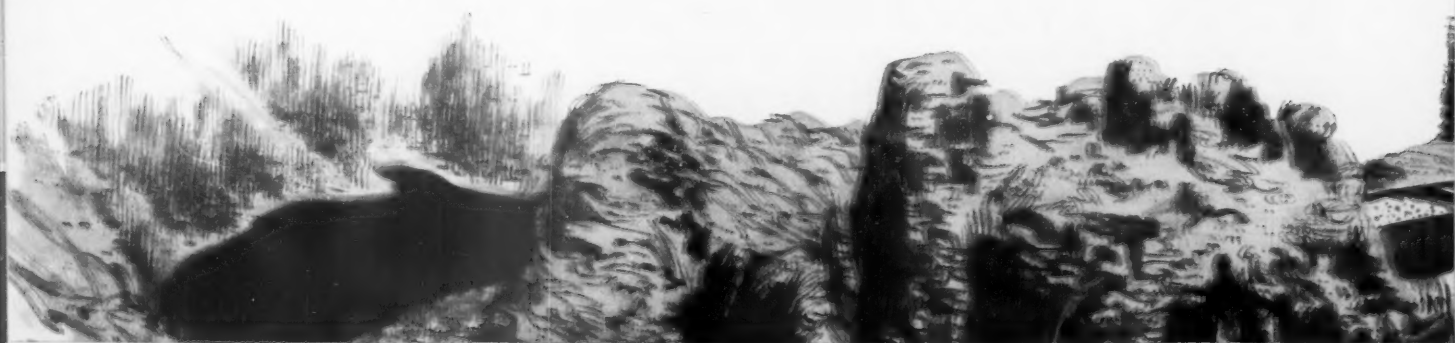
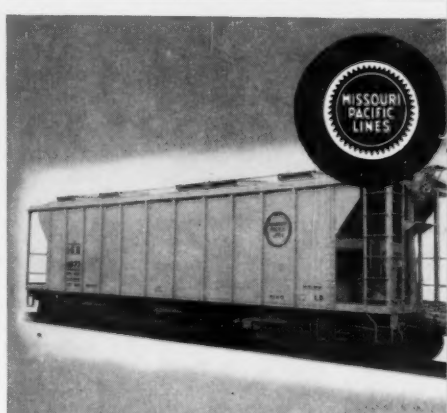
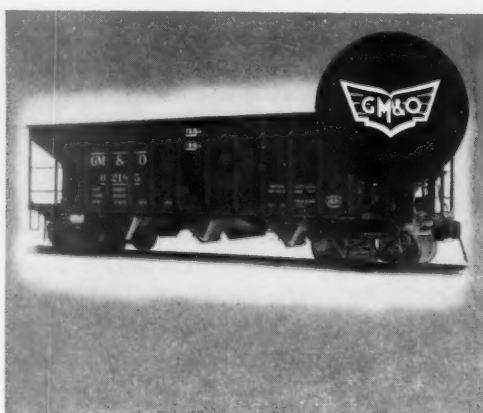
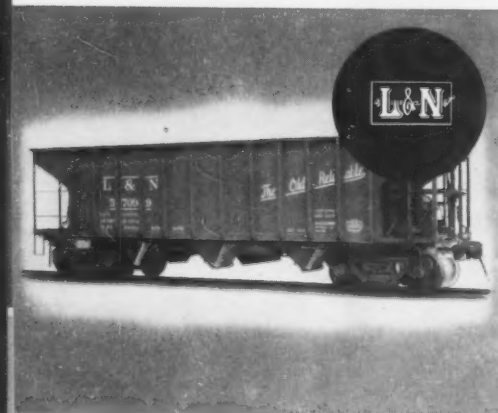
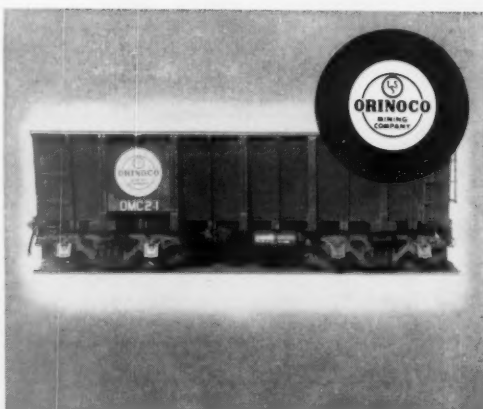
YARD SERVICE (DATA FROM I.C.C. M-215)

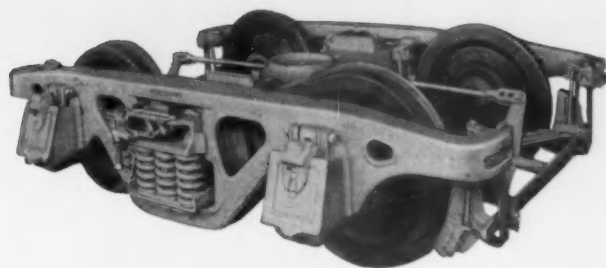
1 Freight yard switching locomotive-hours (000):				
1-01 Steam, coal-burning.....	324	600	1,019	1,809
1-02 Steam, oil-burning.....	55	117	161	345
1-03 Diesel-electric ¹	3,361	3,478	9,767	10,036
1-06 Total.....	3,752	4,219	10,981	12,258
2 Passenger yard switching hours (000):				
2-01 Steam, coal-burning.....	13	21	41	66
2-02 Steam, oil-burning.....	4	5	13	18
2-03 Diesel-electric ¹	261	264	768	773
2-06 Total.....	306	325	904	955
3 Hours per yard locomotive-day:				
3-01 Steam.....	4.60	6.30	4.80	6.40
3-02 Diesel-electric.....	15.20	16.40	15.20	16.30
3-05 Serviceable.....	14.40	14.70	14.50	14.70
3-06 All locomotives (serviceable, unserviceable and stored).....	12.30	12.90	12.40	12.80
4 Yard and train-switching locomotive-miles per 100 loaded freight car-miles.....	1.73	1.70	1.74	1.73
5 Yard and train-switching locomotive-miles per 100 passenger train car-miles (with locomotives).....	.76	.75	.76	.75

¹Excludes B and trailing A units.



For New Ore





Cars

*Specify smooth-riding
Ride-Control® Trucks
that are tailor-made
for your operations!*

Rarely will you find two ore-hauling problems that are entirely alike. That's why practically all major ore shippers specify Ride-Control Trucks. They know that ASF is the only truck-design specialist in a field where specialization insures the *right equipment for the job*.

Heavy loads and severe grades present many problems. For example, the car must be compact—requiring a truck with carefully designed members and often with odd-size wheel base. Brake design, whether clasp or single shoe, must be *integrated* with truck design . . . a problem on which ASF's combined staff of truck and brake engineers can offer you constructive help. And last but not least, the truck has to ride smoothly so that the car will *work together with the roadbed*, instead of pounding itself into the repair shop.

In short, by any yardstick you use—past experience or present engineering facilities—ASF is in a unique position to design the truck that's right for your requirements!

RIDE-CONTROL, A-3

Application based on ASF experience with ore car truck design

Railroad	Carsets
Bessemer & Lake Erie	1,200
Chicago & North Western	300
Duluth, Missabe & Iron Range	5,500
Electro Metallurgical	41
Great Northern	700
Gulf, Mobile & Ohio	100
Louisville & Nashville	252
Soo Line	100
Northern Pacific	600
Orinoco Mining	560
Quebec, No. Shore & Labrador	1,200*

*Made in Canada

TOTAL 10,553

AMERICAN STEEL FOUNDRIES

410 N. Michigan Avenue, Chicago 11, Illinois

Canadian Sales: International Equipment Co., Ltd.,
Montreal 1, Quebec

ASF





C. W. Taylor



S. N. Mills



C. H. Grossman



C. L. Harrison

It was also said that "Some of the efficiency and economy benefits under the new consolidation will depend on Congressional action to authorize use of locomotive inspectors for safety and car service activities. Such interchangeability is prohibited by the Locomotive Inspection Act and amendment of this law will be necessary to accomplish the full benefits of the consolidation."

A bill to amend the Locomotive Inspection Act is pending in the Senate, but Mr. Grossman has gone on record in opposition to the commission's recommendation for such an amendment. The proposal, embodied in a bill, S. 3059, introduced by Senator Bricker (R), Ohio, would eliminate from the Locomotive Inspection Act those provisions under which the director of locomotive inspection and two assistant directors are appointed by the President. It also would eliminate other detailed re-

quirements relating to employment of inspectors.

The purpose of the bill is "to make possible a needed management improvement" in the commission, according to the presentation made to the subcommittee by Commissioner Clarke. The "management improvement" would be complete consolidation of the locomotive bureau with the Bureaus of Safety and Service.

In making his opposition presentation, Director Grossman took the position that his bureau "must be operated as a separate bureau until the act is amended to permit consolidation."

Mr. Grossman went on to present an argument in opposition to the consolidation, and to the bill. The latter, he said, "removes many statutory safeguards pertaining to inspection and makes these features optional with the commission"; its passage "would, in my opinion, cause the

demise of locomotive inspection such as we have today and under which very satisfactory results have been accomplished."

Other opposition presentations were made by interested labor organizations.

Hearings on the bill have not yet been scheduled. If the I.C.C. gets the amendment, it plans to train all personnel now handling field inspections "so that every inspector will be capable of performing any type of assignment under the new Bureau of Safety and Service."

Clarke Becomes DTA Administrator

Interstate Commerce Commissioner Owen Clarke, commissioner in administrative charge of its Bureau of Service, is now also administrator of the Defense Transport Administration.

His predecessor, James K. Knudson, has resigned to enter private law practice.

DTA is now operating with a small staff and is scheduled to suspend operations June 30, 1955, according to the commission's announcement.

N&W Receives Experimental Locomotive

A coal-burning steam-turbine-electric locomotive was shipped recently from the Baldwin-Lima-Hamilton locomotive works at Eddystone, Pa., to the Norfolk & Western.

The experimental engine, with tender with coal and water, weighs 586 tons—1,172,000 lb—and is 161 ft 1½ in. long. It embodies many new factors in design and will undergo extensive road tests on the N&W's mountain divisions before it is pronounced satisfactory for heavy-duty freight service. It was exhibited at a coal show at Bluefield, W. Va., May 26-28. Road tests are now being conducted.

The project, started almost five years ago, was to develop a powerful locomotive having the inherent flexibility of the electric drive, burning coal and having thermal

(Continued on page 14)

SUMMARY OF MONTHLY HOT BOX REPORTS

	Foreign and system freight car mileage (total)	Cars set off between division terminals account hot boxes			Miles per hot box car set off between division terminals
		System	Foreign	Total	
March, 1951.....	3,063,173,942	3,667	10,078	13,745	222,857
April, 1951.....	2,996,562,763	3,702	8,914	12,616	237,521
May, 1951.....	3,013,634,782	5,631	13,737	19,368	155,599
June, 1951.....	2,874,873,495	7,074	15,376	22,450	128,057
July, 1951.....	2,768,920,095	8,886	18,823	27,709	99,929
August, 1951.....	3,009,371,111	9,023	19,092	28,115	107,038
September, 1951.....	2,925,570,545	6,472	13,565	20,037	146,008
October, 1951.....	3,116,490,095	4,131	9,053	13,184	236,384
November, 1951.....	2,939,503,144	2,022	4,405	6,427	457,368
December, 1951.....	2,752,316,133	2,130	5,398	7,528	365,611
January, 1952.....	2,824,298,630	3,208	7,197	10,405	271,437
February, 1952.....	2,809,162,671	2,723	6,473	9,196	305,477
March, 1952.....	2,943,812,727	2,594	5,877	8,471	347,517
April, 1952.....	2,766,313,714	3,826	7,759	11,585	238,784
May, 1952.....	2,918,508,445	6,020	10,938	16,958	172,102
June, 1952.....	2,672,512,889	8,466	14,495	22,961	116,394
July, 1952.....	2,575,298,912	10,566	15,833	26,399	97,553
August, 1952.....	2,924,917,122	11,658	17,535	29,193	100,192
September, 1952.....	2,931,129,734	7,536	13,608	21,144	138,627
October, 1952.....	3,093,990,289	4,058	8,053	12,111	255,469
November, 1952.....	2,984,101,808	2,198	4,501	6,699	445,455
December, 1952.....	2,869,928,617	1,742	3,632	5,374	534,040
January, 1953.....	2,828,906,282	2,219	4,123	6,342	446,059
February, 1953.....	2,625,563,462	2,111	4,059	6,170	425,537
March, 1953.....	2,904,227,804	2,696	6,077	8,769	331,192
April, 1953.....	2,850,752,648	3,383	6,435	9,818	290,359
May, 1953.....	3,013,610,843	5,892	11,433	17,325	173,945
June, 1953.....	2,926,001,360	8,537	15,296	23,833	122,771
July, 1953.....	2,925,317,024	9,342	15,775	25,117	116,467
August, 1953.....	2,971,020,484	8,638	14,160	22,798	130,319
September, 1953.....	2,822,222,832	6,083	10,195	16,278	173,376
October, 1953.....	3,042,558,922	3,863	6,493	10,356	293,796
November, 1953.....	2,788,773,285	1,987	3,404	5,391	517,301
December, 1953.....	2,656,063,018	1,581	2,550	4,131	642,958
January, 1954.....	2,583,485,918	3,082	3,797	6,879	375,561
February, 1954.....	2,445,214,845	2,953	4,066	7,019	348,370
March, 1954.....	2,658,757,249	2,196	3,637	5,833	455,813

KEEP FREIGHT MOVING, WITH NO COSTLY DELAYS

... use dependable Exide-Ironclad battery power!



SUCCESSFUL, SMOOTH freight movements depend on equipment always ready to roll. Exide-Ironclad diesel starting batteries insure quick breakaway and fast acceleration of engine to firing speed. They respond instantly to all power demands made—large or small, continuous or inter-

mittent. There is always a reserve of power, with positive operation of control equipment guaranteed. In addition, lower costs for operation, maintenance and depreciation make Exide-Ironclad diesel batteries your best power buy—**AT ANY PRICE!**



THE POSITIVE PLATES are the heart of any battery. Only Exide uses a slotted tube construction. By use of tubes, more active material is exposed to the electrolyte, providing greater power. Also, more active material is retained, giving longer working life.



DEPENDABLE POWER, ample reserve power for any diesel need, comes from improved Exide-Ironclads. Prompt delivery. For full details, call your Exide sales engineer—write for Form 4843 (Installation and Maintenance of Diesel Starting Batteries).

**Your best power buy
... AT ANY PRICE!**

Exide[®]
IRONCLAD[®] BATTERIES

Exide INDUSTRIAL DIVISION, The Electric Storage Battery Company, Philadelphia 2, Pa.



Experimental coal-burning turbine-electric locomotive now undergoing road tests on the N&W.

efficiency to make fuel cost equal to or better than other forms of motive power. The locomotive, No. 2300, is the joint enterprise of the N&W, Baldwin, Westinghouse Electric Corporation and Babcock & Wilcox Co. The latter company designed a water-tube boiler which produces steam at a pressure of 600 psi and 900 deg F, and which burns coal on a traveling grate with continuous ash removal. Automatic controls maintain full boiler pressure as load fluctuates between idling and full.

No. 2300 is rated at 4,500 hp and is designed for a maximum speed of 60 mph. It has maximum rated tractive force of 175,000 lb and a continuous tractive force of 144,000 lb at nine mph. There are four six-wheel trucks with each axle motorized.

Established features include steam-driven air compressors, stoker and steam whistle.

The tender carries only water—22,000 gals.—plus a softening plant. A coal hopper which holds 20 tons is on the main chassis in front of the engineman and fireman, who occupy an enclosed cab directly in front of the boiler. Behind the boiler is the main turbine. The entire power plant

is assembled as a single self-contained unit supported on the locomotive frame at three points so its alignment is not affected by distortions of the frame. Behind the turbine are the generator, electrical control and dynamic braking equipment for rear trucks.

PERSONAL MENTION

Atchison, Topeka & Santa Fe

H. E. ANDERSON, division master mechanic at Albuquerque, N. M., transferred to Slanton, Tex., to succeed John L. Fertig.

D. J. EVERETT, superintendent of shops at Albuquerque, N. M., appointed superintendent of shops-master mechanic, taking over the former duties of H. E. Anderson.

Baltimore & Ohio

HOWARD P. WRIGHT, assistant electrical engineer, appointed electrical engineer, system, at Baltimore. *Education:* Graduate of Polytechnic Institute. Also attended evening classes at Johns Hopkins University. *Career:* Began as an electrical apprentice



H. P. Wright

with the B&O in 1914, later becoming terminal electrician. For two years as electrical draftsman and inspector for Henry Adams, a consulting engineer. Returned to electrical department of B&O in 1924 and subsequently became assistant engineer, electrical, and in 1942, assistant electrical engineer. Chairman Committee 9—Corrosion, A.A.R. Electrical Section and a member of the Land Transportation Committee, A.I.E.E. (Continued on page 80)

ORDERS AND INQUIRIES FOR NEW EQUIPMENT PLACED SINCE THE CLOSING OF THE JUNE ISSUE

DIESEL-ELECTRIC LOCOMOTIVE ORDERS

Road	No. of units	Horse-power	Service	Builder
Bangor & Aroostook.....	51	1,750	Road switch...	Electro-Motive
Lake Superior & Ishpeming.....	13	1,600	Road freight...	American Locomotive
Northern Pacific.....	20 ²	1,750	General purpose....	Electro-Motive
Union Pacific.....	4 ¹	1,750		

FREIGHT-CAR ORDERS

Road	No. of cars	Type of car	Builder
Central of Georgia.....	500 ³	Box	Pullman-Standard
Pacific Fruit Express.....	200 ⁵	70-ton mechanical refrigerator.....	Company shops

¹ Delivered in June.

² Cost, \$145,000.

³ To be used as five four-unit locomotives. Cost, approximately \$3.5 million. Delivery scheduled for September and October.

⁴ Estimated cost, \$700,000. To be leased to the Camas Prairie operated jointly by the UP and the Northern Pacific. Deliveries made in May and June.

⁵ Cost, \$3,500,000. Delivery scheduled for early fall.

⁶ For frozen food service. Each car will have two independent compressor-evaporator refrigeration systems powered by a single diesel-electric power plant located in a compartment at one end of the car. Chilled air will be forced through ducts throughout the ceiling and inside walls and returned through ducts under the floor—enveloping, but not touching the lading. Defrosting by electric heaters will be automatic every seven days. Work on cars to begin about September 1, with deliveries scheduled to run about two cars a day until completion in the spring of 1955.

NOTES:

Long Island.—A proposed \$58,000,000 improvement program for this road calls for:

(1) Purchase of 184 new passenger cars at a cost of more than \$24,000,000. Of these, 125 would be air-conditioned, fluorescent-lighted, single-deck electric cars with foam-rubber, plastic-covered seats for 120 persons; 57 would be cars of the same general type for non-electrified lines, and two would be Budd rail diesel cars for the Montauk branch.

(2) Modernization of 696 existing passenger cars at a cost of more than \$21,000,000. Much of this work would be done in PRR shops.

(3) Improvements costing more than \$12,000,000 to other railroad facilities. More than half of this would be for rehabilitation and improvement of the road's electrical distribution system, with the balance going for such items as modernizing and re-equipping shops.

The plan calls for approximately half of the 184 new cars to be ordered immediately and the remainder within a year. Modernization of the 696 present cars is under way. Almost half the program is to be completed in three years.

New York Central.—The Budd Company recently announced receipt of a letter of intent from the New York Central to buy 10 of Budd's "Siesta Coaches". The letter of intent comprises a commitment for the first ten of a proposed production lot of 50 or more "Siesta Coaches" at a unit price of \$210,000. It is expected that additional commitments will be forthcoming to fill out the lot. The NYC is also considering the purchase of 62 additional diesel switching units.



He's working on your problem right now...

The Esso Research Engineer, above, is examining a specimen through the electron microscope, the amazing electronic research instrument that magnifies the specimen many thousand times.

Qualified teams of field and lab researchers, using such equipment are constantly developing new and better products to meet rugged fuel, lubrication and operating requirements.

Making a better product for better railroading is our business...and it's going on all the time.



RAILROAD PRODUCTS

Like All Esso Railroad Products These Assure You Dependable Performance

Diesel Fuels	DIOL RD—Diesel lube oil	CYLESSO—valve oil
ESSO ANDOK Lubricants—versatile greases	COBLAX—traction motor gear lube	ESSO Journal box compound
ARACAR—journal box oils	VARSOL—Stoddard Solvent	Asphalt
ARAPEN—brake cylinder lubricant	SOLVESSO—Aromatic solvent	Cutting Oils
ESSO XP Compound—hypoid gear lubricant	ESSO Weed Killer	Rail Joint Compounds
	ESSO Hot Box Compound	Maintenance of Way Products
	AROXY—pneumatic tool lube	Signal Department Products
		RUST-BAN—corrosion preventive

SOLD IN: Maine, N. H., Vt., Mass., R. I., Conn., N. Y., N. J., Pa., Del., Md., D. C., Va., W. Va., N. C., S. C., Tenn., Ark., La.
ESSO STANDARD OIL COMPANY
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EASIEST

TO INSTALL AND MAINTAIN



Hyatt Roller Bearing Journal Boxes are ready to install just as they come from the factory. After box is slipped into place, locking cup is bolted to axle-end, grease is added to the fitting, and box is ready to roll!

Roller bearing journal boxes will put an end to your freight car hot box problem. But only Hyatt boxes will give you maximum savings on installation and maintenance.

Installation of Hyatt straight-roller boxes is a one-man job. It takes only a few minutes. No special tools are required and bearing adjustments are not necessary! The box is simply slipped onto the axle—over the one-piece inner race, locked into position, and lubricated. That's all.

Disassembly, naturally, is equally simple. Press fits are not disturbed when removing either a box or a wheel, and because spare axles and wheels need to be fitted with inner races only, your investment in spare parts is substantially reduced.

Write for our new Maintenance Manual. It will give you complete information on the amazingly simple assembly and maintenance procedure for Hyatt Journal Boxes.

HYATT

STRAIGHT



BARREL



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HYATT BEARINGS DIVISION • GENERAL MOTORS CORPORATION • HARRISON, NEW JERSEY

ROLLER BEARING JOURNAL BOXES



PST

BOX CARS

*built by
Pullman-Standard
Car Manufacturing Company
for the*





the PS-1



58,000 Demonstrations of Success

Over 58,000 PS-1 Standardized Box Cars are in service throughout the Nation. PS-1s have been purchased by 61 of America's railroads, and four departments of the Government.

The standardized PS-1 offers railroads continuous Research and Development and Engineering concentrated on a single product model. Such a costly approach could not be applied to limited production cars.

And the same principle applies to production, since specialized modern production line techniques are used to produce PS-1s.

The success of the principle of box car standardization, is individually demonstrated by each of the more than 58,000 PS-1s on The Great American Railway System.



Research and Development

Pullman-Standard R&D Laboratories, the most complete in the field of carbuilding, submit PS-1s and manufacturing processes to extensive and continuous tests. If areas for improvements are revealed, all parts possibly affected by any specific weakness are carefully considered for redesign.

Multi-phase Production

Modern production methods contribute greatly to PS-1 durability and economy. PS-1s pass from position to position under a multi-phase production system. At each station specialists, highly trained in the functions of that position contribute to the building of each car.

Sales and Service

Sales and Service Engineers travel thousands of miles each year to examine PS-1 Box Cars actually in service. Inspections are made under widely varying climatic conditions. Field survey reports are ultimately translated into PS-1 improvements through the coordinated efforts of R&D, Engineering and Production.





BOX CAR

. The PS-1 Box Car is the product of America's railroads. The PS-1 combines
 . many outstanding features to make a box car that will serve efficiently and
 . economically under the diverse operating conditions encountered on all miles
 . of track of The Great American Railway System.

. The components of the PS-1 are engineered with economy and service in mi
 . Neither heavy weights nor light weights, PS-1s meet all strength requirements
 . by design, not merely by costly bulk. Components implement each other
 . to withstand hard service through teamwork. PS-1s are built by advanced
 . production line techniques, including costly jigs, fixtures and dies, impossible
 . for limited production cars. The methods used result in important economies
 . as well as greater over-all structural strength.

. Pullman-Standard confidence in PS-1 design, durability and in-service
 . performance has been verified by acceptance. Over 58,000 PS-1s have been
 . put to work by 61 railroads.



f **PS-1 ROOFS** have earned wide acceptance by great strength and durability. Riveted units built up of roof sheets and carlines, PS-1 Roofs are riveted to car sides and ends. Upward-extending carlines are hair-pin-shaped steel sections which form a water-shedding cap. Roof sheets are corrosion resistant copper-bearing galvanized steel. Added roof strength is gained by use of service-tested, die-pressed corrugations of flared design. PS-1 Roofs are engineered against weather, drumming and buckling even under severest conditions of impact, vibration and rack.

e **THE PS-1 END** is designed for maximum strength through contour corrugations. Made in two die-formed parts, automatically arc welded together, the PS-1 End uses 3/16-inch steel sheets for the top half, 5/16-inch for the bottom. The end is riveted to stringers and center sill. The end sill, integrated as part of the end, eliminates a vulnerable-to-corrosion point. Unique embossing at the top of the end adds to strength and to leak-proof roof fit. Inside, each PS-1 End is provided with 7 horizontal wood furrings secured by 1/2-inch stud bolts welded into place. End lining is attached to furring, and is additionally retained by a pressed Z-bar extending entirely across the car end. PS-1 End design allows use of more simplified self-clearing corner post construction.

d **PS-1 SIDES** are engineered to be especially rigid, uniform, and durable. Fabricated of sheets automatically welded together and to Z-bar side posts, PS-1 Sides lead in pound-for-pound toughness. Side sheets are outside side sill and side plate, and are automatically welded to both. Sides are riveted to door posts, and, in car assembly, the complete side is riveted to the ends. Side sill reinforcement is of pressed steel continuously arc welded to the side sill so that the two members act as one.

a **THE PS-1 WELDED DRAFT LUG** arrangement has strength and durability proved over twenty years of service. Of built-up and arc welded design, this important component has passed many impact tests and the demands of hard in-service usage. Striker, draft lugs and center filler are all of welded construction, and are precision positioned by costly jigs. Considered standard by many railroads, the PS Welded Draft Gear provides rigid construction with important savings in weight and costs.

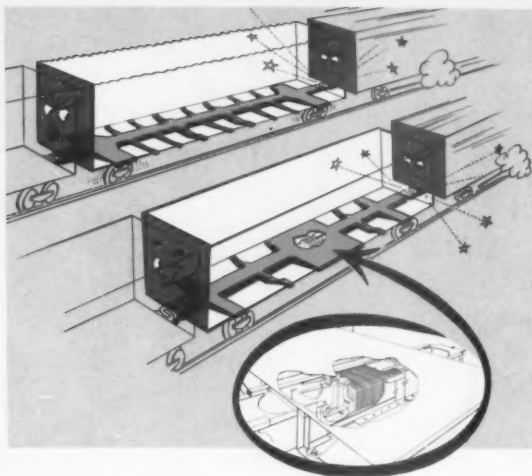
b **THE PS-1 BOLSTER CENTER FILLER** is stronger than ever, due to the advanced fabrication processes and new design. Improved welding techniques, developed by Pullman-Standard, and important structural changes now provide better stress-flow, as has been confirmed by Pullman-Standard's Research and Development dynamic testing methods. As in other PS-1 Box Car components, precision jigs and fixtures give fabrication accuracy, and contribute to overall quality and performance.

c **THE PS-1 UNDERFRAME** incorporates many important refinements which offset the costly and damaging effects of increasing in-service speeds, shock and impact. As an illustration, the present PS-1 Box Car Underframe includes heavy-duty floor construction which provides an additional cross-tie and two additional stringers. PS-1 Underframes are made with precision through use of special jigs and fixtures. Service records prove the superiority of their design and construction.

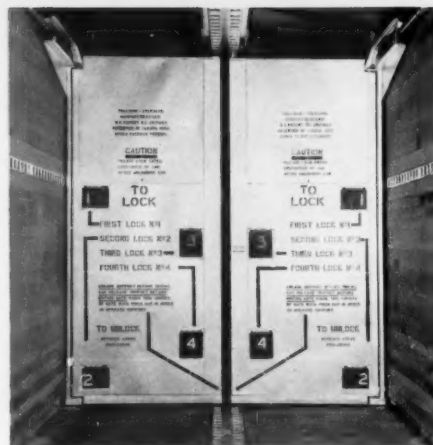
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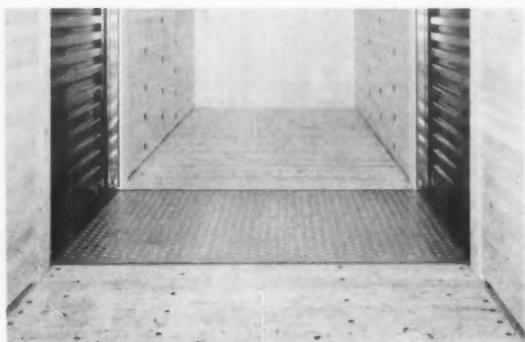


PS Cushion Underframe promises to make important reductions in damage to lading by absorbing impact shock. Even with impact speeds above normal, indications are that the Cushion Underframe will minimize damage loss ratios. PS-1 Box Cars can be delivered Cushion Underframe equipped when specified by purchasers.

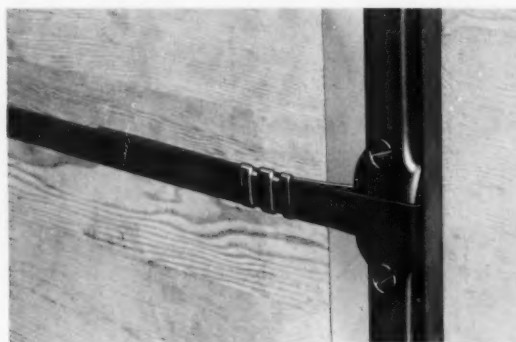


PS Compartmentizer is two sets of rugged steel gates that divide a PS-1 into three compartments. Lading cannot become mixed, and contents of one compartment cannot damage the contents of another. The PS Compartmentizer is expected to make an important contribution in the continuous battle against lading damage.

Other Box Car Parts



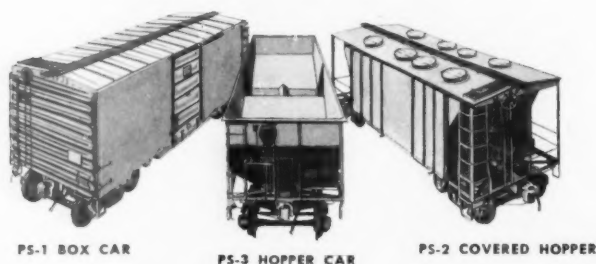
Floor Plates—Pullman-Standard can provide floor plates for Box Cars to PS design.



PS Lading Strap Anchors—PS Lading Strap Anchors and floor clips are kept in stock and can be ordered separately for application to Box Cars.

A Pullman-Standard Sales Representative will be pleased to discuss the PS-1 and other PS freight or passenger cars. Contact the Pullman-Standard office nearest you. Informative literature is available as well.

Built to serve best on the
GREAT AMERICAN RAILWAY SYSTEM



PS-1 BOX CAR

PS-3 HOPPER CAR

PS-2 COVERED HOPPER

YOUR NEEDS CREATE THE PULLMAN "STANDARD"

PULLMAN - STANDARD

CAR MANUFACTURING COMPANY

SUBSIDIARY OF PULLMAN INCORPORATED

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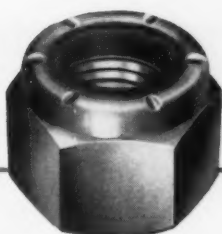
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Printed in U. S. A. A-927

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...safety devices



secured with *Elastic Stop*® nuts

***safety appliances and
others such as:**

coupler carriers
draw gears
pedestal tie bars
brake rigging
spring equalizer seats
truck mounted equipment
center plate bolts
miscellaneous equipment
on under frame

Today, major Diesel builders are using Elastic Stop nuts for a variety of critical applications.* No other fastener provides so much positive protection against the pounding vibration that is a part of modern high speed freight and passenger operation.

Elastic Stop nuts offer production and maintenance advantages, too. The same elastic collar that damps out vibration makes the nuts self-locking—a one-piece assembly—and reusable many times.

Many roads are replacing double nuts or castellated nuts with Elastic Stop nuts wherever safety of personnel and maintenance costs are factors. ESNA can serve you better on these and all other critical applications.



Elastic Stop Nut Corporation of America
also maker of the ROLLPIN



*Mail
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self-locking fasteners for locomotives,
freight and passenger cars.

Dept. N61-723, Elastic Stop Nut Corporation of America
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Please send me the following free information:

- ☐ Elastic Stop nut bulletin
☐ Rollpin bulletin

- ☐ Here is our problem.
What fastener do you suggest?

Name _____ Title _____

Firm _____

Street _____

City _____ Zone _____ State _____

Major Railroad reduces switching time

Six hours siding time per train saved with radio
equipped cabooses

THE PROBLEM

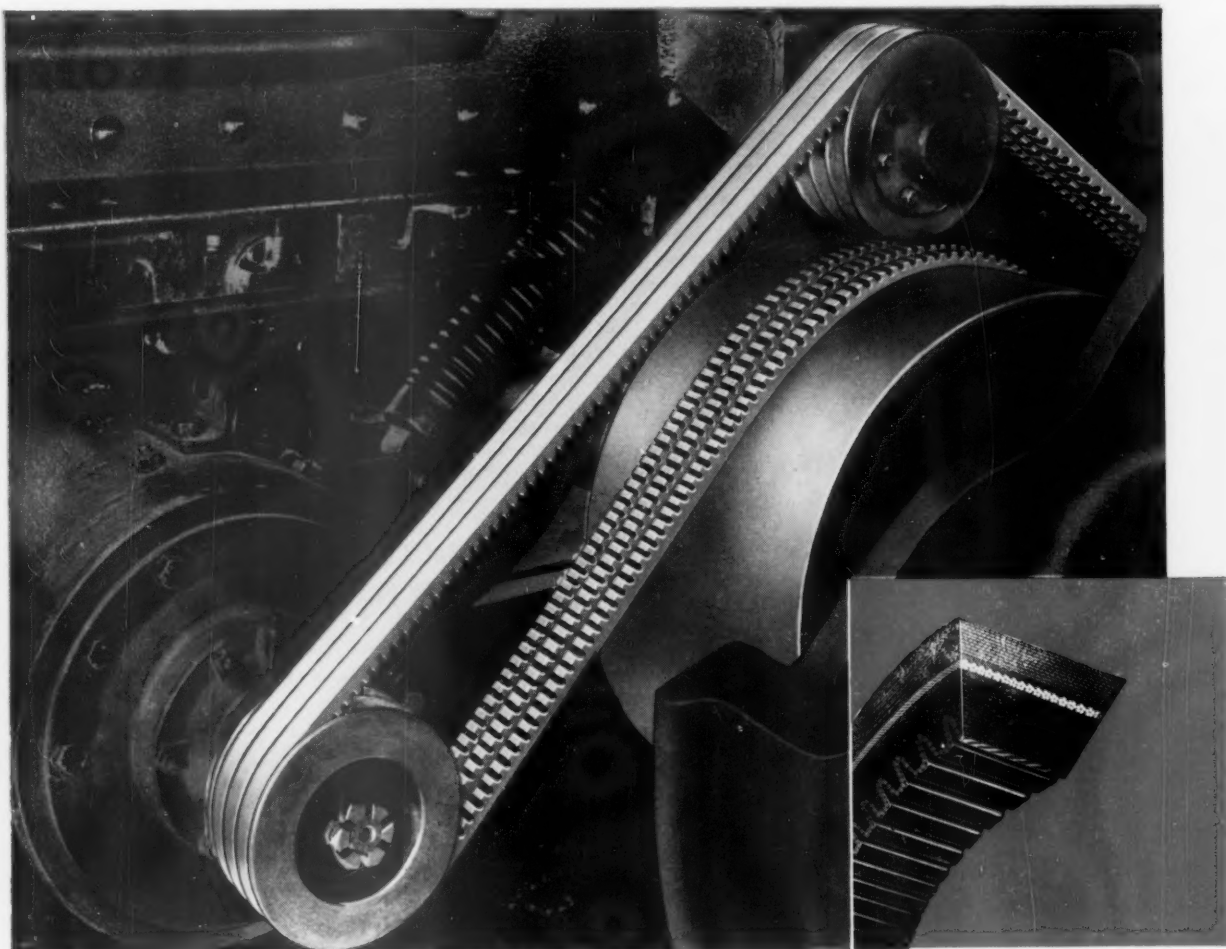
How to speed up movement of freight trains, reduce switching time and lower operational costs with increased safety posed a problem for one of the nation's largest southwestern railroads. Improved communications between caboose and locomotive, between train and dispatcher as well as from train to train was the obvious solution to the problem. This was solved by equipping 250 freight trains with 2-way generator powered voice radios.

How to maintain constant, *unfailing* communications was solved in part by employing Safety Car Heating & Lighting Co. direct drives and Leece-Neville step-up type installations. The final security against power and contact failure depended on the choice of V-Belt drives to develop the power. For the solution to this phase of the problem Dayton Field Engineers were consulted.

THE SOLUTION

Dayton Field Engineers recommended Dayton Endless Cog-Belt axle drives because of their proved ability to deliver extra mileage under all conditions and because of their complete adaptability to both Leece-Neville and Safety Car power plants. On this recommendation the railroad placed 250 Dayton Endless Cog-Belt drives in service and checked them over a two year period. Results have completely justified the recommendation. Time lost in train handling has been reduced 23% . . . actual operating cost lowered 16% . . . 6 hours have been saved *per freight train* in movement through the division.

Even more important, however — as costs went down the SAFETY factor went up with Dayton Endless Cog-Belts, famous for continuous, uninterrupted operation. Constant voice contact between conductor, engineer, and dispatcher



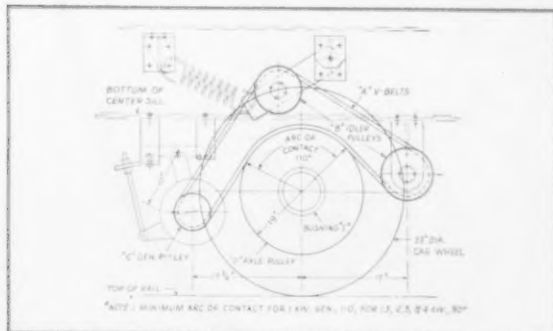
23% with Dayton Cog-Belt* Caboose Drives

personnel was thus assured, switching time minimized. In addition, maximum use of clear track was obtained and added safety guaranteed.

Provides steady electric power for radio communication and caboose lighting

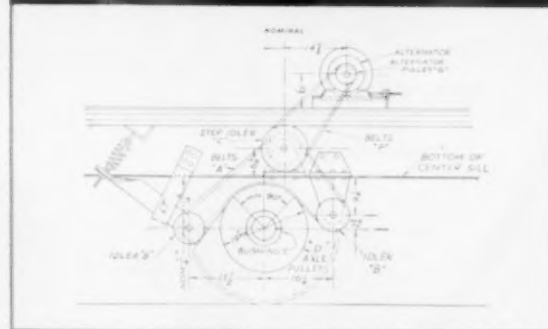
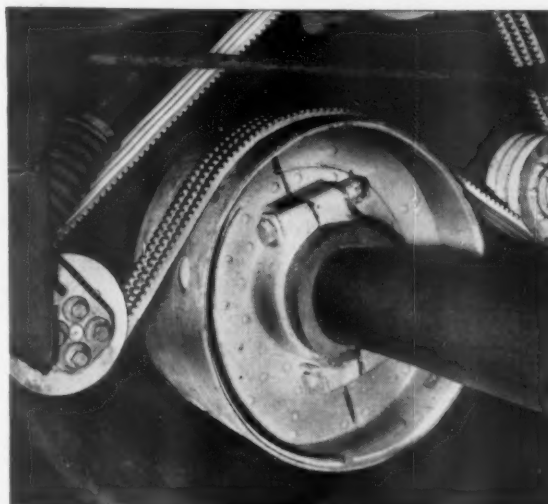
Packing power into generators and safety into railroading, Dayton Cog-Belt Caboose Drives have been in operation since 1942. Now, between 1400 and 1500 Caboosees are equipped with generators for radio communication and lighting or both. Of these, over 90% are equipped with Dayton drives.

If your railroad is not receiving the benefit of extra power at a saving to be found in Dayton V-Belts and Cog-Belts write direct to Dayton Rubber Co., Railway Division, Dept. 205, Dayton 1, Ohio, to learn what Dayton V-Belts and Cog-Belts can do for you.



Dayton Endless Cog-Belts on Safety Car Heating & Lighting Co. plant

The generator in this direct-type drive is suspended under the caboose in the customary manner. The drive consists of a single primary or axle segment. Tension for the drive is applied to either the generator or one idler. Dayton Cog-Belts deliver maximum power for the drive because of their established higher load-carrying capacity.



Dayton Endless Cog-Belts on Leece-Neville installation

This is a step-up type of drive, as indicated in the diagram and photo. The power plant has a primary or axle drive and a secondary drive to accommodate high speed alternators and generators which can be placed up inside the caboose. Dayton Endless Cog-Belts are ideally suited to this type of operation.

© D.R. 1954

*T.M.

Dayton Endless Cog-Belts are designed for easy and minimum maintenance. Simple to apply, it takes only 15 minutes to install a complete set of Dayton Cog-Belts on the drives shown here. No special tools required. The greater strength and flexibility of Dayton Cog-Belts have led them to be specified as a component part on over 90% of all caboose drives in operation.

Railway V-Belts by

Dayton Rubber

- Since 1905

World's Largest Manufacturer of V-Belts

Dayton Rubber Co., Railway Division, Dayton 1, Ohio



KING is recognized, today as for half a century past, as the *best* vertical boring and turning machine for all-around maintenance work in the railway shops of America.

American Steel Foundries

KING MACHINE TOOL DIVISION

1150 TENNESSEE AVENUE — CINCINNATI 29, OHIO

NEW DEVICES

Interchangeable Freight Car Bearing

The Timken Roller Bearing Company, Canton, Ohio, has just announced a new freight car journal roller bearing application which has been designed to make available a bearing of increased capacity; a design which will fit into both pedestal and integral frame applications (with minor box modifications) thereby permitting the railroads to carry a minimum number of bearing types and, finally, to make such a bearing available at an 18 to 25 per cent reduction in the cost, depending on the size.

This new roller bearing design makes it unnecessary to have a companion journal box of special design, the assembly being of such nature that it is applicable to existing boxes and to journal boxes in integral truck side frames with slight modifications to the box. Adapters are used with the different applications.

Lending itself to high-speed automatic production, the new freight car journal bearing has been standardized so that parts within the bearing application can be interchanged. This is a heavy-duty application suitable for any type of freight

car service. It can be used with both integral box type side frames commonly used on existing plain-bearing-equipped freight cars and pedestal-type side frames used on new roller bearing-equipped cars.

The new double-cup freight car application actually is two bearing assemblies together with two seals forming an enclosed unit. This permits the use of larger bearing elements and the possibility of still getting into the same limited space requirements of the integral box type side frame. Because of the elimination of the necessity of a separate journal box more efficient utilization of metal from the standpoint of bearing capacity is made possible.

This new bearing unit, now available for 5 in. by 9 in., $5\frac{1}{2}$ in. by 10 in., 6 in. by 11 in. and $6\frac{1}{2}$ in. by 12 in. axle journals is assembled and lubricated at the factory before shipment. Provision is made for the subsequent lubrication, in service, as conditions require. The bearing unit can be removed from the shipping carton and applied directly to the axle journal by pressing it on. The present range of available sizes cover the requirements for 40, 50, 70

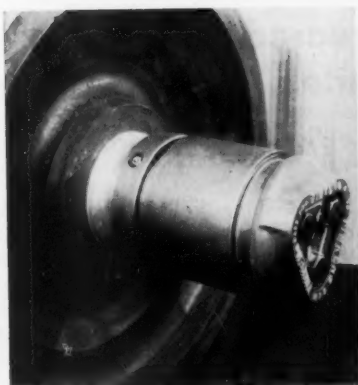
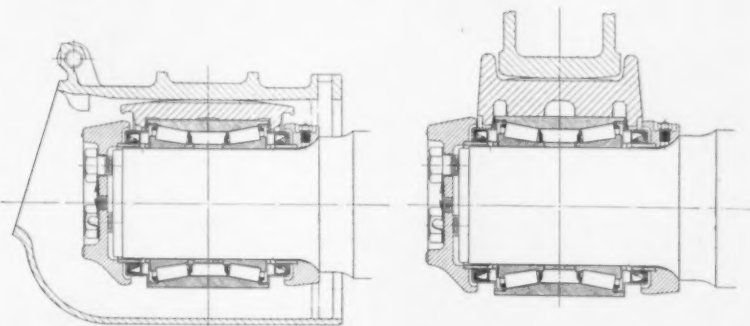
and 90-ton capacity cars. The application is designed so that the bearing, other than the backing ring and the end cap, is reversible, and therefore workmen cannot get the assembly on backwards.

The rubbing type seals used in this design are of the same basic design that has been used in the Timken freight car applications for the past four or five years. The seal, as may be seen from the drawings, is contained in an outer member which is press-fitted into the counterbore in each end of the cup. This seal is replaceable as a unit.

The axle for the new Timken freight car application for the standard A.A.R. freight car roller bearing axle which can be machined from an existing plain bearing axle provided the journal diameter has not been worn down more than $\frac{5}{16}$ in. before the original diameter.

The capacity of this new bearing assembly is in the classification of the existing heavy duty applications and it is expected that the service life will be approximately three times that of existing cartridge type bearings.

The bearing assembly and the method of its application are shown in the three illustrations below and the two drawings at the right. The complete bearing unit, the adapters and the grease seals are clearly shown.



New TIMKEN® heavy-duty cuts freight car roller *to bring the "Roller Freight"*



**Comes from factory pre-assembled and pre-greased ready to press
on the axle right out of its carton**

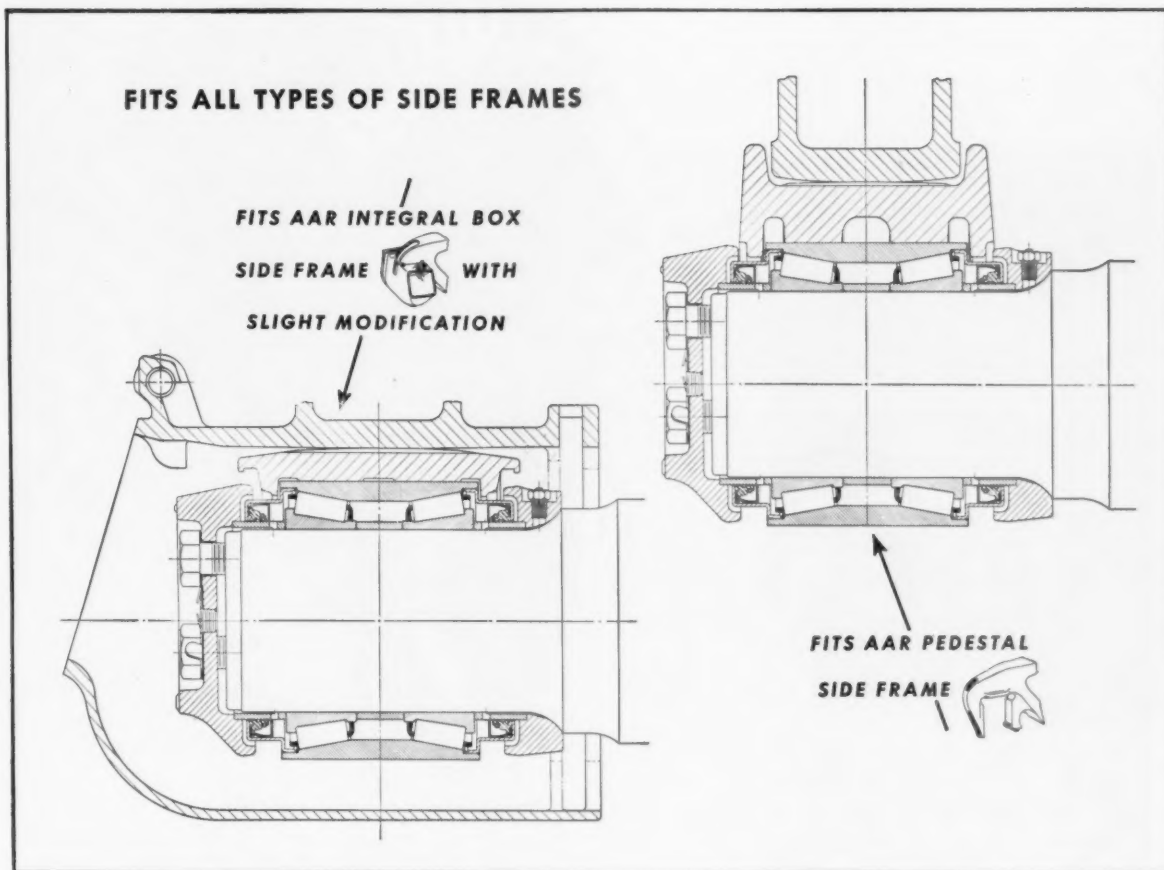
First heavy-duty bearing that fits all side frame types

After years of development, The Timken Roller Bearing Company announces a revolutionary new *heavy-duty* Timken® bearing assembly that cuts the cost of applying roller bearings to freight cars 18% to 25%, depending on the size of car and type of side frame.

The lower cost results from 1.) a new, more economical *heavy-duty* design and 2.) production savings brought about by concentrating on one *heavy-duty* roller bearing assembly that fits all types of side frames for each size axle—5 x 9, 5½ x 10, 6 x 11 and 6½ x 12.

By slashing the initial cost of roller bearings for freight cars, the new Timken tapered roller bearing makes "Roller Freight" a more economical investment than ever — brings the coming "Roller Freight" age a big step nearer, with important benefits for railroads and shippers alike.

bearing assembly bearing costs 18% to 25% *age a big step nearer*



The new Timken *heavy-duty* bearing assembly not only costs less to buy—it costs less to install, less to use.

Costs less to install because it comes from the factory pre-assembled and pre-lubricated with AAR-approved grease, ready to press on the axle right out of its carton.

Costs less to use because it's the first *heavy-duty* roller bearing assembly that fits all standard AAR types of side frames. No need to carry *two* types of spare axle assemblies for replacement.

The high capacity, yet low cost, of

the new bearing assembly is made possible by better utilization of space. The outer race acts as the housing, making room for the large, long rollers that assure high capacity and heavy-duty performance.

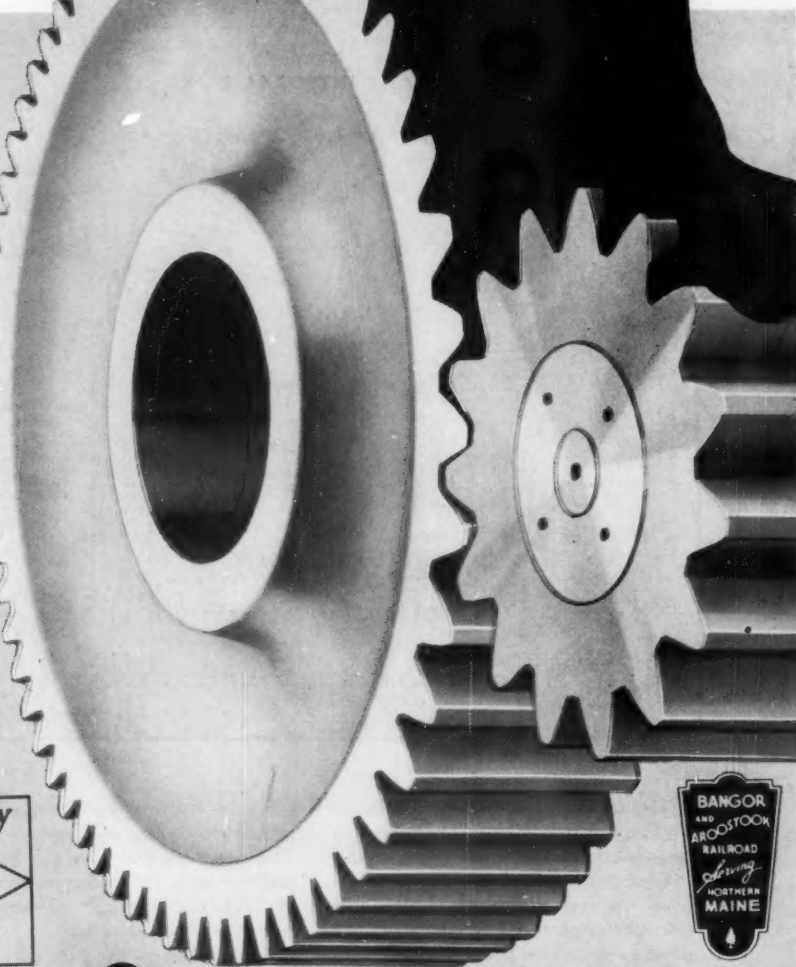
In addition to the big, extra cost-saving advantages of the new Timken bearing assembly, you get all the proven advantages of its tapered design. The taper makes Timken the only bearing you can count on to eliminate the hot box problem and cut operating and maintenance costs to a minimum.

Get the full story *today* of how the new Timken *heavy-duty* freight car bearing assembly can give you all the advantages of Timken tapered roller bearings at a new low cost. Phone, wire or write The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

TIMKEN
TRADE-MARK, REG. U. S. PAT. OFF.
TAPERED ROLLER BEARINGS

For Diesel Traction Motor Gears...

SINCLAIR JET



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M-K-T
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BANGOR AND ARROSTOCK RAILROAD
Serving Northern Maine

MAINE CENTRAL RAILROAD

LUBRICANT-TM

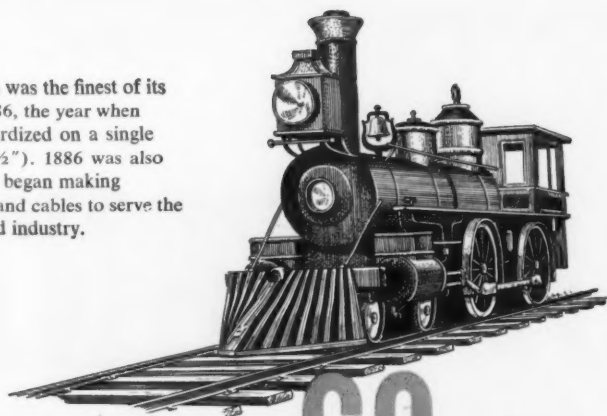


Since its introduction in 1952, Sinclair JET Lubricant — TM has reached that acme of acceptance where it is now being used by many of the nation's most prominent railroads. The emblems shown represent only part of the total number of railroads using this All-Year Lubricant. Actually, *more than 70 railroads are using* JET Lubricant — TM. Isn't it time you, too, investigated the advantages of this top quality railroad lubricant?

Contact Sinclair Refining Company,
Railway Sales
New York, Chicago, St. Louis, Houston

**SINCLAIR
RAILROAD
LUBRICANTS**

This locomotive was the finest of its type back in 1886, the year when railroads standardized on a single gauge (4 ft., 8½"). 1886 was also the year "U. S." began making electrical wires and cables to serve the growing railroad industry.



In step with America's Railroads for 68 years

U. S. Electrical Wires and Cables

Year by year, America's railroads become more and more dieselized and electrified. That steps up the demand for electrical wires and cables. But it also means that manufacturers have to turn out wires and cables of tougher specifications, greater durability, wider versatility. The tremendously complex centralized traffic control systems and other "push-button" devices need the finest wires and cables obtainable.

United States Rubber Company is right in the middle of this tremendous railroad electrification growth. For 68 years "U. S." has been supplying railroads with the wires and cables required—as well as *anticipating* future demands. "U. S." has gone along side by side with the railroads, as they grow into an ever stronger national transportation system—a system unmatched in economy, efficiency and safety.

"U. S." is the only wire and cable manufacturer growing its own natural rubber, making its own synthetic and plastic compounds. Through this unequalled *control of manufacture*, "U. S." can always guarantee *superior insulation* in every type of wire and cable it produces.



Above is the United States Rubber Company wire and cable factory in 1886. Below (left) as it looks today.



Just as this up-to-the-minute Diesel typifies the advancement in locomotion, so also "U. S." electrical wires and cables typify leadership in their field, as they have for 68 years.



UNITED STATES RUBBER COMPANY
ELECTRICAL WIRE AND CABLE DEPARTMENT • ROCKEFELLER CENTER, NEW YORK 20, N. Y.

This is **COPPER PENETRATION**

a leading cause of **AXLE FAILURE**



The irregular, sharply defined lines you see on this axle journal are fluorescent indications of copper penetration. Glowing under black light, they reveal that this axle is unsafe for service!

This is a photomicrograph of a part of the section cut from the axle where MAGNAGLO showed copper penetration (arrow). Enlarged more than 400 times, it clearly shows how copper has penetrated the grain structure of the steel, weakening it to the point of probable failure.

MAGNAGLO*—

and **Only MAGNAGLO**—

**Detects and Marks It
*Every Time!***



Careful, prolonged studies by leading railroads indicate that whenever a journal overheats to the flow point of copper, penetration by *copper and other bearing metals* is likely to occur. This is invisible on the journal surface.

Safety demands that such axles be inspected. While other means are sometimes used, MAGNAGLO is the *only reliable test* to detect penetration by copper and all other metals—even at the earliest stages.

Considering the safety it assures, its cost is very little. *It should be a requirement for all suspect axles!*

If you would like further data on this very important and timely subject, please write us.

*T.M. Registered U.S. Patent Office

MAGNAFLUX CORPORATION

7320 West Lawrence Ave., Chicago 31, Illinois

New York 36 • Pittsburgh 36 • Cleveland 15

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Now is the Time!

The interest in apprenticeship which was strong in the mechanical departments of the railroads thirty years ago has been greatly weakened during the past generation. Several causes have contributed to this result: (a) the depression of the 1930's; (b) the railroads' failure to utilize the services of all apprentices graduated; (c) lack of agreement between management and unions as to the number of apprentices to be employed; (d) manpower shortages during the war, which led to (e) upgrading helpers.

The effect which these factors have had on apprenticeship is not confined to the railroads. All industry has fallen behind in meeting the need for trained craftsmen. Speaking before the Tenth Annual Eastern Seaboard Apprenticeship Conference, Rocco C. Siciliano, assistant secretary, United States Department of Labor, said that about 240,000 skilled mechanics had to be replaced in American industry annually. At present, he said, only about 40,000 young men complete their apprenticeships each year. Approximately an equal number of qualified men are supplied by immigration. This leaves an annual gap of not less than 150,000 jobs which must be filled by men who are less than adequately trained.

There was never a better time for the mechanical departments of the railroads to renew their interest in apprenticeship. The transition from steam to diesel motive power is approaching completion, with a considerable change in the craft alignments on the locomotive side of the department. The

principal needs are for electricians, machinists, pipe fitters and tin smiths. The need for blacksmiths has long been receding and the need for boilermakers has now become very limited. A remarkably good job has been done during the transition period with men who had no background of diesel practice, but many of whom were thoroughly trained mechanics. For the future the need is going to be for just as thoroughly trained mechanics who can deal effectively with every aspect of the diesel electric locomotive within the range of their own craft and, in some circumstances, with some aspects outside their own craft.

A relatively new factor in the field of apprenticeship which is making itself felt is the Bureau of Apprenticeship of the U. S. Department of Labor. This agency has been something of a catalyst in bringing unions and management together in negotiating craft agreements and in establishing satisfactory apprenticeship programs. This agency is also a much needed factor in preventing interest from waning in programs, once they have been established.

Railroad shops are not a production industry. They deal with all kinds of repair jobs none of which is exactly like any other. While this may not be as universally true with diesel motive power as it was with steam, it is still true in principle and the railroads will be wise if they train mechanics who are entirely competent to tackle any problem of maintenance which may arise.





UNRETOUCHED PHOTO showing bearing after approximately 750,000 miles of service. Note that grease has retained its consistency. This is typical of the long-lasting protection afforded by *Texaco 979 Roller Bearing Grease*.

TEXACO 979 ROLLER BEARING GREASE

MORE THAN 50 leading railroads use *Texaco 979 Roller Bearing Grease*. Millions of miles of actual road service prove that it assures—

- ★ **Better Lubrication**—reaches and protects all parts of the bearing.
- ★ **Longer Service Life**—resists leakage, stays in the bearing, retains consistency in severe service.
- ★ **Superior Oxidation Resistance**
- ★ **Year 'Round Lubrication**—equally effective winter and summer, no seasonal change required.

Fully meets all A.A.R. specifications and was among the first greases to be...

**A.A.R.
APPROVED**
for journal roller bearings

- ★ **Greater Protection Against Rust and Wear**—seals out dirt and moisture.
- ★ **Longer Bearing Life, Lower Maintenance Costs**

A Texaco Representative will gladly give you the full story. Just call the nearest Texaco Railway Sales Office in New York, Chicago, San Francisco, St. Paul, St. Louis or Atlanta. Or write The Texas Company, *Railway Sales Department*, 135 East 42nd Street, New York 17, N. Y.



TEXACO Railroad Lubricants
AND SYSTEMATIC ENGINEERING SERVICE

**IN ALL
48 STATES**

EDITORIALS

Maybe Chromates Are Safer

Talk to railroad men today about how they are treating their diesel radiator water and most hesitate to say anything for publication. Those using chromates understandably do not want to broadcast the fact because of fear of stirring up trouble. Those using a substitute are not anxious to go on record as all that we've talked to feel that the cost is greater and the protection less.

Perhaps it is time to quit avoiding the issue. Let's get at the heart of the problem. Do chromates contribute to or detract from overall safety for all concerned—the shop man, the engine crew and the traveling public?

Anything less than the best in water treatment detracts from optimum radiator performance. This in turn detracts from maximum engine and overall locomotive performance and hence safety to the operating crew and passengers on both the train concerned and others in the vicinity. There is the further consideration that with a given budget to maintain motive power, the added cost of inferior water treatment plus greater water system maintenance cost will mean that fewer dollars are available for maintaining other important parts of the locomotive. This does not contribute to the best interests of the railroad or any of its employees.

There does still remain the question of the man actually handling the chromate solutions. Is he subject to undue risk? If he is, it would be neither fair nor reasonable to expect him to continue their use regardless of the general benefit to others. Just how great is this risk, and is the risk inherent in handling chromates?

From the evidence we've heard, no serious consequences will follow the proper handling of chromates. Perhaps there are people who are overly sensitive. Should we eliminate a useful product because a few people are affected by handling it? Or should we seek out better ways to handle chromates? Maybe we need additional precautions, or merely more rigid policing of present precautions.

It is not easy to see why chromates should be much if any more dangerous to work with than a number of other materials—battery acid, cleaning solutions, solvents and the like—which are handled day in and day out in railroad shops. Would it be unreasonable therefore to concentrate first on trying to eliminate what hazards do exist in handling chromates? While there would of course be some slight temporary risk involved in experimenting with new ideas for the safer handling of chromates, is it not likely to be less than the continuing risk of inferior water treatment?

The Section Goes Forward

The Electrical Section of the Association of American Railroads will hold no general meeting in 1954. The rea-

sons for this decision are unimportant in the face of the fact that the Section committees are more active than they have ever been before. Some of the finest reports ever produced by the Section have already been issued. More will be issued within the next few months and much new material is being developed and refined for presentation at the 1955 meeting in Montreal. Also, the Section is to issue a complete new manual covering a greater scope and more valuable material than the present manual.

It has been decided that only one copy of each report will be distributed to each member railroad. This means, of course, that few members of the Section at large and others interested in electrical developments will have an opportunity to see the reports. To make up in part for this deficiency, *Railway Locomotives and Cars* will publish excerpts from the reports. It would be impossible to reprint them in full because of their size, and impracticable because much of them consists of specifications which are revised after discussion, to become standard or recommended practice for inclusion in the Manual.

Those parts of the reports which will appear in these pages will therefore, be such as are concerned with new developments and progress of the industry.

It is, of course, unfortunate that we shall be deprived of the benefit of discussion. Only after the reports have been refined in this fire, can we be sure that what remains is fact and that all important factors have been included. The most important thing is that the Section is increasing its usefulness to the railroads even though handicapped by a difficult situation. You can't keep good men down.

Where Do We Stand?

As the intensive study of freight-car journal-box service continues, certain facts are becoming clear. First, it is evident that the No. 1 problem is to secure reliable lubrication, one aspect of which is to eliminate waste grabs. Second, the journal box and its contained parts constitute a very crude mechanical device, but it cannot readily be dropped for something entirely new because there are 16 million of them in service. Third, there are possibilities for overcoming some of worst mechanical features of the present journal-box assembly without completely changing its basic design.

The establishment of these facts is by no means a solution of the problem of producing satisfactory journal-box service. It does, however, indicate the direction from which the most fruitful results may be obtained with the least delay. When these results have been attained and depending upon their nature, it will become clearer whether or not attention should be concentrated on a long-range program for the adoption of something different and fundamentally better in design than the present standard journal-box assembly.

New Books

METALS AND HOW TO WELD THEM. By T. B. Jefferson, editor, The Welding Engineer, and Gorham Woods, metallurgist. This combination text and reference book, for the welding operator, supervisor, instructor, engineer, designer and manager, gives a practical work knowledge and source of information for designing and making better welds at lower cost. It explains, in readily understood steps, the structure and properties of metals and how to weld them. The first six chapters are an elementary discussion of metals, their mechanical and physical properties and uses. The fundamentals of metallurgy and their significance in heat treating and welding are explained, and the data then related to correct welding procedures for steels, cast iron, nonferrous materials and hardfacing. All commonly used types of metals are covered. The final section of the book is on the making of good welds, trouble shooting, and cost estimating, with an explanation of welding terms.

The James F. Lincoln Arc Welding Foundation, Cleveland 17. Price in U.S.A., \$2; elsewhere, \$2.50.

HEATING, VENTILATING, AIR CONDITIONING GUIDE. The chapters brought up to date in the 1954 Guide by major changes include Heating Load, Fuels and Combustion, Chimneys and Draft Calculations, Panel Heating, Pipe, Fittings, Weldings, District Heating, Air Cleaning, Automatic Controls, Electric Heating, and Owning and Operating Costs. Recent Society research has been used as a basis for extending the data on the effect of shading of glass and for improving the chapter on Air Distribution. The 52 chapters are grouped in seven sections: Fundamentals; Human Reactions; Heating and Cooling Loads; Combustion and Consumption of Fuels; Systems and Equipment; Special Systems, and Instruments and Codes. Transportation Air Conditioning is dealt with in a chapter in the Special Sections section. A 24-in. by 32-in. ASHVE Psychrometric chart is printed in two colors. An edge index gives immediate access to any desired chapter of text or any section of the Manufacturers Catalog Data.

American Society of Heating and Ventilating Engineers, 62 Worth street, New York 13. Price, \$10.

DIESEL ELECTRICS . . . HOW TO KEEP 'EM ROLLING. Many readers of *Railway Locomotives and Cars* will be familiar with the contents of this book, in which are collected 24 articles appearing under the above general title. All of the articles were edited by A. G. Oehler, electrical editor of *Railway Locomotives and Cars*, and some of them have been reprinted in groups of three or four chapters for general distribution. The book explains the electrical fundamentals which underlie the operation of all types of diesel-electric locomotives. It deals specifically with many problems of inspection, servicing and maintenance of

diesel-electric locomotives. Since the material is fundamental, it will continue to be useful as long as diesel-electric motive power operates on the railroads. The language is nontechnical and makes readily understandable to all employees who have any part in the operation or maintenance of the locomotives the "why" of the "how" instructions in the manuals which otherwise they must follow more or less blindly. This is the first time all of the material has been made available in a single volume. It is a valuable source of practical electrical knowledge that will be found useful to any one in railway service who has to do with diesel-electric locomotives and is not an electrical engineer.

Simmons-Boardman Publishing Corporation, 30 Church street, New York 7. Price, \$2.50, with discount for quantities.

Letter to the Editor

An Answer on Iron-Back Bearings

TO THE EDITOR:

Referring to "A Reader's" letter commenting on the editorial on copper penetration which appeared in the March 1954 issue.

It was unfortunate that only a part of the statement was quoted to the effect that 90 per cent of the car journals that are broken off while overheated are due to non-ferrous metal penetration. The complete statement contained also the phrase that this condition occurred at a single heating at the time of burn-off. Because a journal has been turned down after overheating does not necessarily mean that it has copper or non-ferrous metal penetration. It may have run hot but not to the temperature required to produce this condition or it may not have had sufficient stress to open up to any appreciable depth to permit penetration of non-ferrous metals.

The writer of the above letter apparently has missed a point in that lining metal will usually melt out of a bearing back before the temperature is sufficiently hot to satisfy the other conditions to cause copper penetration.

The elongation and reduction of area in iron back bearings cited by the reader is typical of a bearing failure that would be expected with an iron-back bearing. To have worn down and elongated to the amount quoted it must have been running hot on the back without lubrication for a lengthy period of time. This condition has also occurred with bronze-back journal bearings at times but in all such cases examined it has been found that the bearing back usually was broken and in the bottom of the journal box and that the contact was with the wedge or the roof of the journal box. The lower value of heat transmission for the iron back bearing is probably its most serious handicap.

ANOTHER READER

Here's why Magnus R-S JOURNAL STOPS

give you

Better Freight Car Performance

Big improvement due to elimination of waste grabs, better journal lubrication, longer bearing life, reduced car servicing and maintenance requirements.

PREVENT excessive axle displacement in freight car journal boxes and you lick the major source of bearing troubles. That's exactly what you do with Magnus R-S Journal Stops and here is how they help.

No over-run lining, no displaced packing, no crushed dust guard. You get better lubrication—not only because the packing is held where it belongs, but also because the box does not rise to compress packing during braking or impacts. That helps maintain journal-packing pressures—provides a constant feed of oil to the bearing. And because the bearing cannot be cocked off the journal, you won't trap any loose strands under the bearing crown. Oilers can service cars faster, too.

You can also get real benefits if you use R-S Journal Stops with pad or mechanical lubricators—or packing "containers." Bearings last much longer regardless of lubricating method—don't get the concentrated uneven

**This CAN'T HAPPEN when you use
R-S Journal Stops**

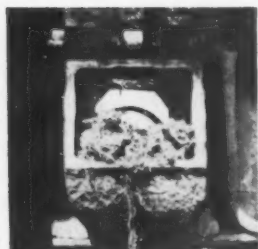
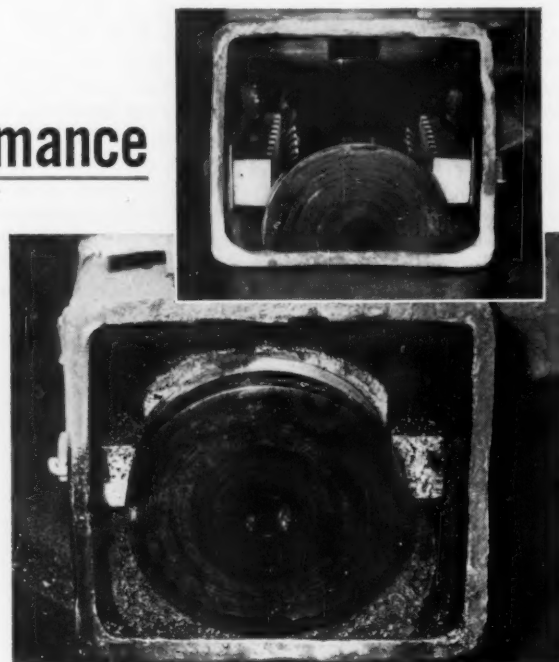


Photo of journal box at impact of 6 mph, showing how bearing is cocked off journal and packing is displaced.



When air and hand brakes are both applied, note how bearing and entire box are raised, compressing packing.



Journal box with R-S Journal Stops after flat switching impact at 11½ mph. Packing is still in proper position. Compare with photos below. Inset shows mounting of R-S Journal Stops with box jacked and packing, bearing and wedge removed.

loading that spreads linings, disrupts oil films. After two years' service, bearings originally applied with test sets of R-S Journal Stops were found to have crown bearing only 2½" to 3" wide—practically identical to conditions found at inspection after six months' operation. Dust guards were undamaged, and there was only slight wear on the Stops.

Now Available for Separable Boxes

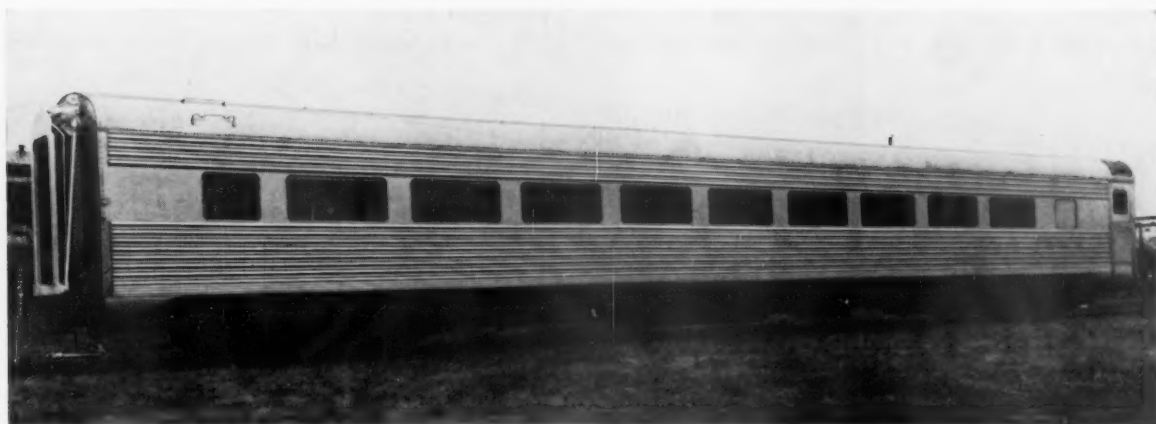
New designs permit application of R-S Journal Stops to separable boxes as well as integral-cast boxes—with the same big improvement potential. For complete details write to Magnus Metal Corporation, 111 Broadway, New York 6, N. Y.; or 80 E. Jackson Boulevard, Chicago 4.

MAGNUS
Solid Bearings



*Right for Railroads
...in performance...in cost*

MAGNUS METAL CORPORATION *Subsidiary of* **NATIONAL LEAD COMPANY**



First P-S coach with stainless-steel structure ready for application of Katy stencil.

Pullman-Standard Designs

Stainless Steel Passenger Coach

Structure to consist of 17-7 alloy with yield strength of 60,000 to 80,000 psi. Frame and sheets, formed by arc welding, assembled by spot welding similar to builder's girder type low-alloy steel cars.

STAINLESS STEEL as the principal structural material for passenger cars has recently been used by Pullman-Standard Car Manufacturing Company in building a passenger coach. Stainless steel was first used by this builder as exterior sheathing for passenger cars in 1936, and was subsequently used for all exterior surfaces. In the 72-passenger coach, recently built and now sold to the Missouri-Kansas-Texas, with the exception of a few members, stainless steel is used throughout the structure, including the underframe, side frames and roof.

As the result of extensive tests and design studies, Pullman-Standard engineers concluded that a structure made up of extra high-strength members of relatively thin gage requires assembly, either by spot welding or riveting, with gussets of wide flanges at junction points to provide sufficient area for attachment. At many places stiffness rather than strength determines the design and extra material is required, such as stiffening flanges on

posts. Such a large number of gussets and splice plates are required on a structure of this kind when extra high-strength stainless steel (over 90,000 psi yield point) is used in thin sections, that the resultant side frame would be as heavy as this company's conventional low-alloy steel frame.

Pullman-Standard tests also showed that stainless steel of 60,000 to 80,000 psi yield strength can be satisfactorily arc welded, with high ductility, retaining a minimum yield point after welding of 55,000 psi. Test specimens of stainless steel welded to low-alloy steel failed only in the parent metal.

As a result of extensive welding research and tests, Pullman designers reached the conclusion that the best stainless-steel structure was essentially that of a design this builder has followed in the construction of its low-alloy cars, used on over 6,000 cars now in service.

All superstructure members of the new car and parts

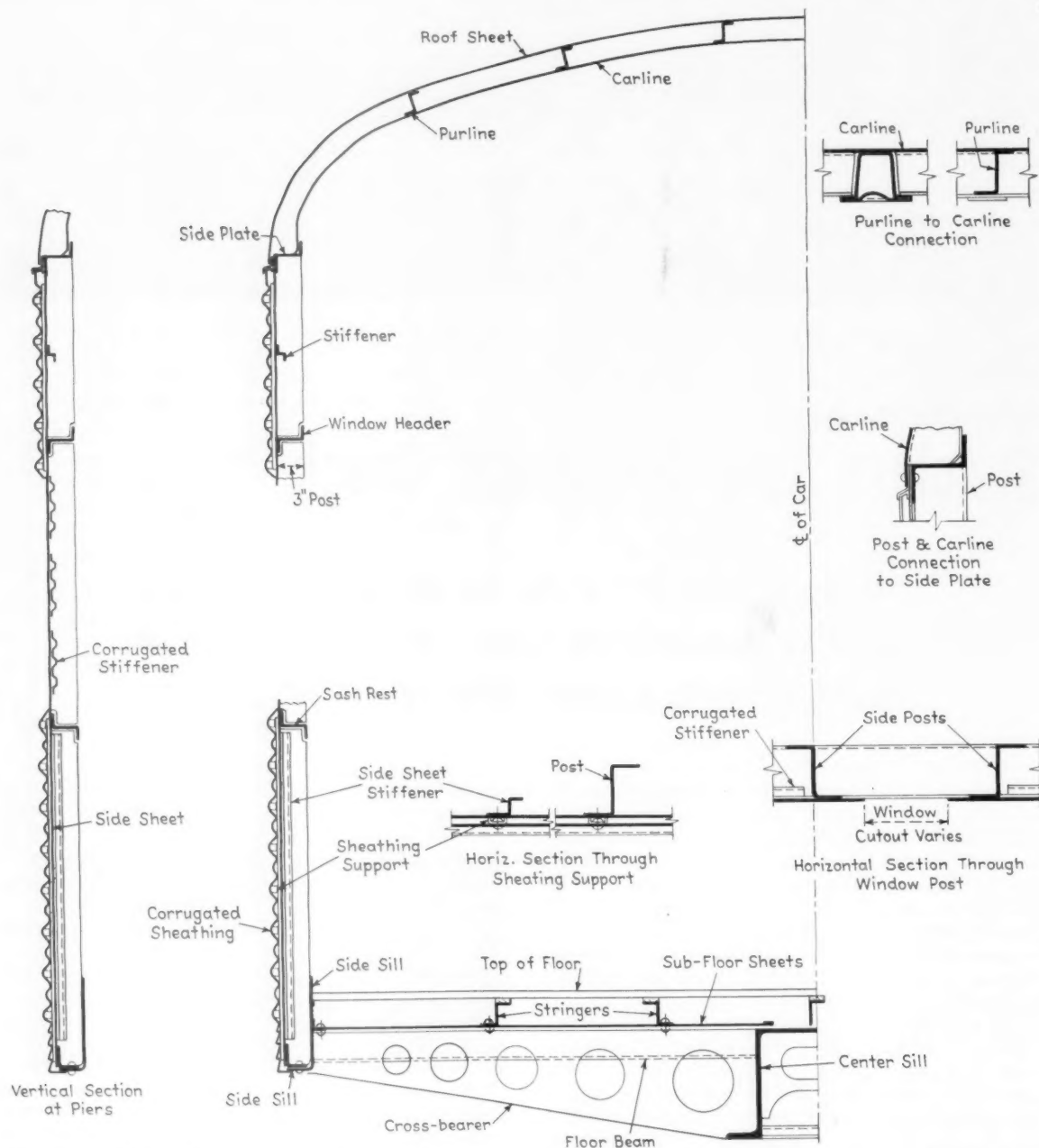
of the underframe are of stainless steel except the main end posts and related antitelescoping plate at the dummy end. Major members of stainless steel include inside side sills, side frames, side sheets and stiffeners, fluting, end frames and sheets, floor stringers, arched floor sheets, subfloor sheets, roof, carlines and purlines, vestibules, steps and step wells, vestibule side doors, body end doors, sash supports, and welded inside finish supports.

Certain parts of the underframe, as well as the main end posts and antitelescoping member at the dummy end, are of low-alloy steel. The builder's engineers believe that this results in a better structure than one

using stainless steel. Junctures of stainless steel and low-alloy steel which are considered subject to electrolytic action are in the open where adequate protection can be applied.

The superstructure includes side frames of longitudinal angles and zeos, arc welded to zee posts and forming an integral unit. The girder sheets consist of a number of sheets, submerged-arc welded into a single unit and spot welded to the frame. The roof, consisting of abutting sheets arc-welded to carlines, retains a smooth, readily cleanable contour.

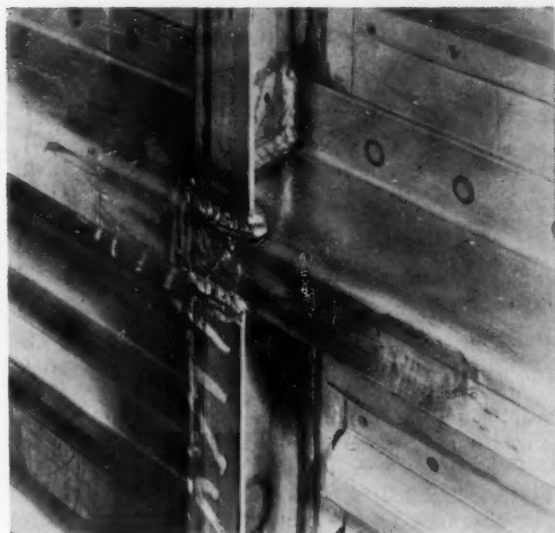
While the Katy stainless-steel coach was built of low-



Cross-section of P-S stainless-steel car with girder-type side frames and corrugated sheathing. The center sill, crossbearers and crossbeams are low-alloy, high-strength steel.



Left to right: Blind end; vestibule end with door open and steps down; and vestibule end with door closed and step closure raised.

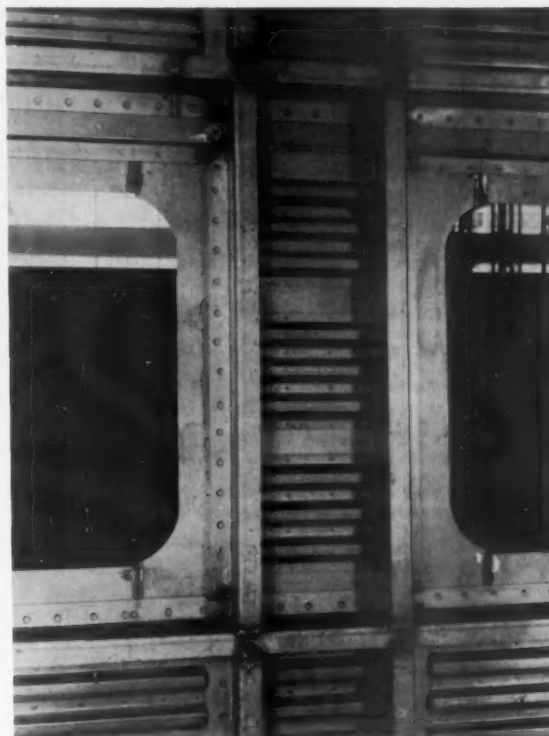


Typical junction of vertical and horizontal side-frame members.

nickel high-manganese material (because of government restrictions on the use of nickel), future cars will use 17-7 stainless, when available, for structural members. In either case, the physical properties are similar, with a yield strength specified as 60,000 to 80,000 psi. There is a minor drop in the strength at welds, but with the proper welding rod the minimum yield point will meet all design requirements and corrosion resistance is not impaired.

Necessary repairs to any parts of these cars can be made with arc-welding equipment found in most railroad shops. A major repair to the side of the car can be handled completely from the outside without removing the interior finish and appurtenances. The horizontal and vertical framing zeers are arc-welded in place and sheets can be applied to these zeers by seam-welding and plug-welding, all accomplished from outside.

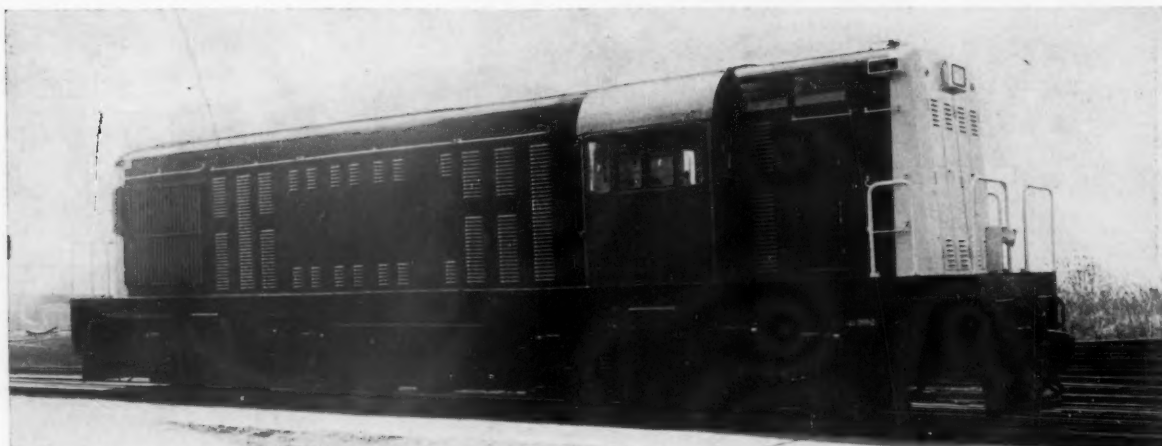
The cost of the Pullman-Standard stainless-steel car will be competitive with that of other cars built of this



Typical side frame construction. Vertical side posts are arc-welded to sash rest and window header. The side-sheet application shown is for a car with flat sides (no fluting), using corrugated stiffeners spotwelded to the inside surface of the side sheet.

material. Since the general design follows that of present lightweight, low-alloy, high-tensile-steel cars built by this company, shop tools, dies, jigs and fixtures are now available for production of the new car.

The first P-S stainless-steel car delivered to the Katy has a scale weight of 130,600 lb, which is comparable with the weight of other coaches of essentially the same floor plan and recently built to utilize modern materials and lightweight designs.



One of the Brazilian locomotives on the test track of the Erie Works of the General Electric Company.

Meter-Gage Diesel-Electrics for Brazil

The fuel situation in Brazil first gave impetus to electrification.
Diesels are now looked to as the means for developing the country.

By E. E. Martin

BRAZIL'S 55,000,000 people are served by some 23,000 miles of railway, more than 90 per cent of which is laid to meter gage. The principal lines radiate from the two largest cities—Rio de Janeiro and Sao Paulo. The remainder are confined largely to the coastal area, running inland for comparatively short distances from various seaports. In recent years the principal construction effort has been directed toward closing the gaps between the various systems to give a continuous north-south rail connection. Although several links remain unclosed, construction has been pushing ahead and it is hoped that the work will be completed in the near future.

Most of the railways in Brazil are now owned by the federal government, or by the government of the state in which they operate. They are generally subject to the authority of the National Department of Railways and are operated by native Brazilian directors appointed by the president of the republic.

The largest railroad system is the Central of Brazil with lines fanning out from Rio de Janeiro. The main line between Rio and Sao Paulo and the suburban lines out of these two cities, totaling approximately 800 miles, are 5-ft 3-in. gage. The remaining main track and branch lines, about 1,300 miles, are meter gage.

The fuel situation in Brazil gave impetus, first to electrification, and later to dieselization. The Rio suburban service of the Central Railway is operated by multiple-unit electric trains, and a program of dieselization is being carried out on the rest of the system. In this connection 40 meter-gage diesel-electric locomotives were purchased from the International General Electric Company. They will be operated in road service from Belo

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Horizonte, about 30 miles north of Rio, to Monte Azul.

These locomotives closely resemble the conventional road switcher type. The operating cab is located near one end. The longer equipment cab houses the diesel-engine generator set, the control and auxiliary equipment. The shorter cab houses the braking resistor and batteries. The single control station in the operator's cab is located so that the units operate with the short equipment cab leading. This gives better visibility.

Cab and Running Gear

The platform is fabricated of rolled plates and shapes. Two main sills take all static and buffing loads. A housing suitable for AAR draft gear is built integral with each end of the platform.

The cab is fabricated of sheets and light bent up sections. A large hatch with a hinged and counterbalanced cover is located on each side of the roof over the engine. This gives easy access to the cylinder heads for maintenance, and the cab itself is removable for engine change-out. Air for the diesel engine and for cooling the electric equipment is taken into the cab through louvers in the doors. The engine-cooling radiators are located in a compartment separated from the engine cab by a bulkhead. Air enters through the vertically mounted radiators on both sides of the compartment and is exhausted through the roof by a fan.

Two three-axle, swing-motion swivel trucks are used. The necessary swing motion for operation on curves is provided by a mechanism located entirely outside the

truck frame. This leaves space for mounting a traction motor on each axle and keeps the truck length to a minimum. It thus makes possible a lower, shorter and therefore lighter locomotive. Hardened steel inserts, shaped so as to achieve a rolling action, are used at the top and bottom of the suspension links. The swing motion is cushioned in rubber for easy riding.

The truck frames are fabricated from carbon steel plates and shapes by electric welding. Rolled steel wheels 36 in. in diameter are used. Four sets of carbon steel springs, all of which have snubbers, are used in each truck. They rest on drop equalizers which have been flame-cut from steel plate. All axles are fitted with grease lubricated roller bearing journals.

Propulsion Equipment

Power is supplied by an Alco 12-cylinder, V-type, four-cycle turbosupercharged diesel engine capable of developing 1,600 horsepower for traction at 1,000 r.p.m.

Engine cooling water is circulated by a centrifugal pump, mounted on the engine. The cooling system consists of two vertically mounted radiators and a fan mechanically driven from the free end of the engine through a shaft, eddy current clutch, and right-angle gear box. Fan speed is regulated by thermostatic control of the eddy-current clutch excitation. Each radiator is fitted with a thermostatically-controlled shutter. The system is designed for operation from 14 to 113 deg. Fahrenheit.

Lubricating oil is carried in a sump in the engine base and is circulated by a positive displacement pump, mounted in the engine. An oil cooler and two oil filters are used.

Combustion air is cleaned by four filters mounted in the turbo-charger inlet housing. These are easily removable for cleaning.

The engine is directly connected to a General Electric model GT-581 separately excited d-c generator which supplies current to six GE-761 traction motors, three in each truck. Cooling air for the motors is furnished by two centrifugal blowers mechanically driven by the diesel engine. An amplidyne exciter and an auxiliary generator for battery charging are mounted on the end of the main generator and are gear driven from the generator shaft. The main generator has an auxiliary winding for use in cranking the engine from the storage battery. The whole engine-generator set is bolted directly to the locomotive platform at four points.

Control

The locomotives are equipped with single-station, multiple-unit control and are designed to be operated with a maximum of four units in multiple. The single operator's cab is located near one end and arranged for right-hand operation. The throttle lever, selector handle, reverse handle, brake valves, instrument panel, sander, air horn valve, window wiper controls and light switches are grouped conveniently at the engineer's position. Almost all of the control equipment is housed in a compartment immediately back of the operator's cab. It is accessible by doors from the cab and by removable panels from the rear. Some auxiliary control devices and instruments are housed in a small compartment to the left of the engineer's position.

The control is arranged to give series-parallel motor

MAJOR DIMENSIONS

Track gauge	39 $\frac{1}{2}$ in.
Overall length inside knuckles	51 ft 6 in.
Height	13 ft
Width	9 ft
Truck wheel base	10 ft 7 in.
Overall wheel base	35 ft 11 in.
Wheel diameter	36 in.
Minimum radius curve	230 ft
Weight (fully loaded)	
Locomotive	213,600 lb
Per driving axle	35,600 lb
Engine 1,600 hp Alco V-12	
Traction force and speed	
Starting tractive force (at 30 per cent adhesion)	64,000 lb
Continuous tractive force	44,400 lb
Maximum speed	60 mph
Supplies	
Fuel	1,400 gal
Lubricating oil	200 gal
Engine cooling water	250 gal
Sand	24 cu ft
Air reservoir capacity	62,000 cu in.

connections with two steps of field shunting, as follows:

- (a) Two motors in series, three groups in parallel.
- (b) Two motors in series, three groups in parallel, weak field.
- (c) Six motors in parallel.
- (d) Six motors in parallel, weak field.

Automatic transition is provided.

The power plant regulation system is similar to that used on the Alco-GE 1,600 hp. road switcher locomotive. It consists of a General Electric electro-hydraulic governor acting in conjunction with the amplidyne excitation system.

Dynamic Braking

The control provides dynamic braking for handling trains on descending grades. Power is dissipated in two vertical stacks of air-cooled resistors. Cooling air is supplied by a single motor-driven, axial-flow fan mounted below the stacks. Air is taken in through louvers in the doors of the braking resistor compartment and is exhausted through a duct at one side of the top of the cab. The blower motor is connected so that part of the power being dissipated in the resistor is used to drive the fan.

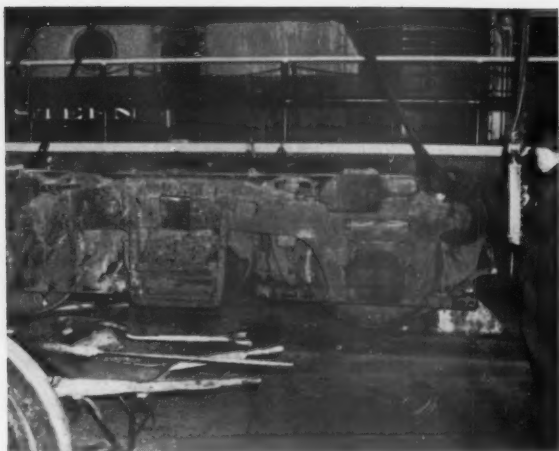
Since the diesel engine is idling during dynamic braking, the traction motor blowers are running at their lowest speed and furnishing the last amount of cooling air to the motors. Therefore, air ducts, specially designed to give low pressure drop, were built into the locomotive platform, thus assuring sufficient cooling air for the motors during dynamic braking.

Air Brakes

Westinghouse Schedule 14EL combined independent and automatic air brakes are used. The brake valves are located at the engineer's position. Individual 7-in. by 6-in. brake cylinders operate clasp type brakes on each wheel. The brake rigging is designed to give a brake shoe pressure of 65 per cent of the weight on the wheels with 50 psi pressure in the cylinders.

Air for the system is supplied by an air-cooled, three-cylinder, two-stage compressor, driven directly from the diesel engine. At 1,000 rpm the compressor has a displacement of 225 cu. ft. per min. against a pressure of 140 psi. The total main reservoir air capacity is 62,000 cu. ft.

A hand brake, which operates on one wheel, is provided for holding the locomotive at standstill.



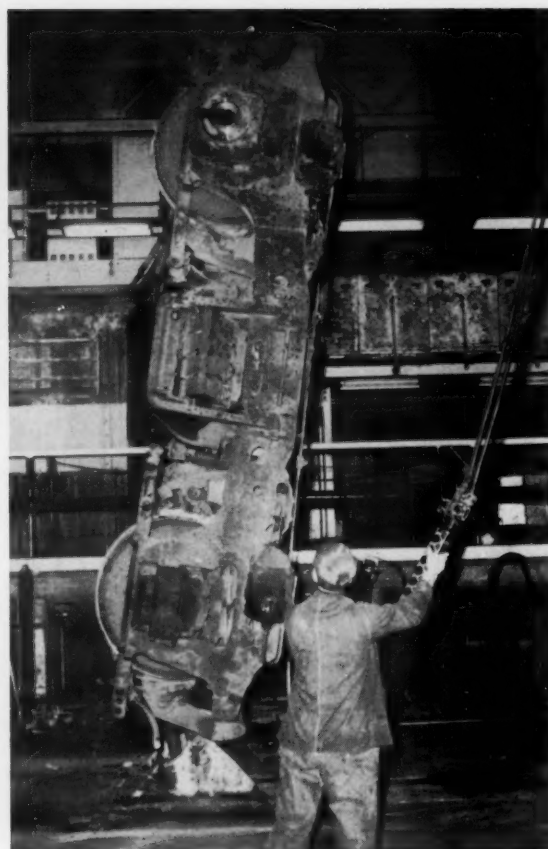
1. The truck is delivered to the stripping area from the drop pit release track by the 30-ton traveling crane.



2. It is set down with one end on the track and the other end on a turning stand permanently mounted on the shop floor.



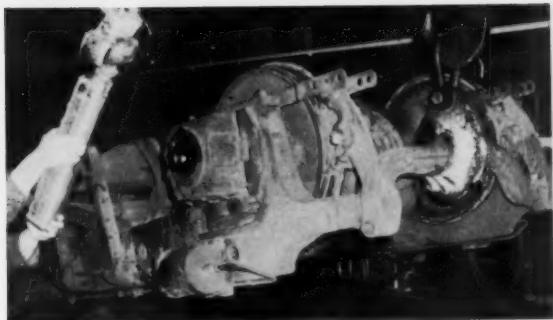
3. A turning link is whitewashed and closely inspected for cracks every three months.



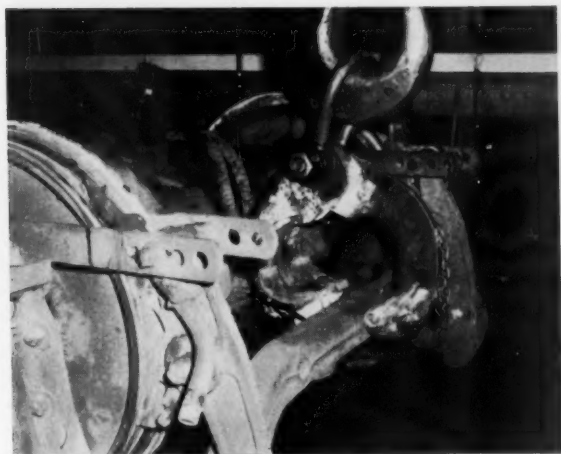
4. The link is attached to one end cross-member and the truck turned over with the floor-mounted support stand as the pivot point.

Two Men Strip Diesel Trucks in 30-35 Minutes

The Chicago & North Western dismantles four-wheel diesel freight and switcher trucks at the Proviso enginehouse in 30 to 35 minutes with two men, or if the truck is needed in a hurry, in roughly half that time by using four men. The dismantling is done with the truck turned upside down after the journal and motor support bearing boxes have been drained. The trucks are stripped on the blind end of the release track. One shop drop pit track serves as a running repair track on one side and the other as a dead work track. The truck coming from either of these locations is pulled or carried by the traveling crane and placed with one end cross member on a floor-



5. The free end is set on wooden blocks while the other end remains in the support stand for the stripping operations.



6. The turning link is then reversed to avoid catching on the inside of the end channel later when the truck is righted.



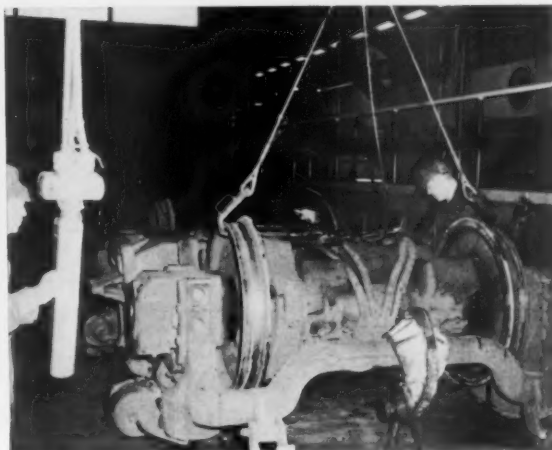
7. The binders are taken off with the aid of an impact wrench, then the four inside brake hanger pins removed.



8. This permits the slack adjuster end of the hangers to be pivoted into the open.



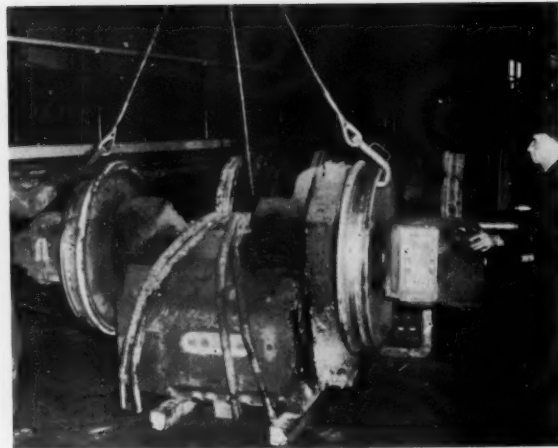
9. In the open it takes only a minute to remove the nut with an impact wrench, clean and grease the slack adjuster, and re-apply the nut.



10. The wheel set and traction motor can now be removed without compressing or removing the suspension blocks.



11. A lifter with three different-length cables removes the two wheels and the traction motor lifting lug.

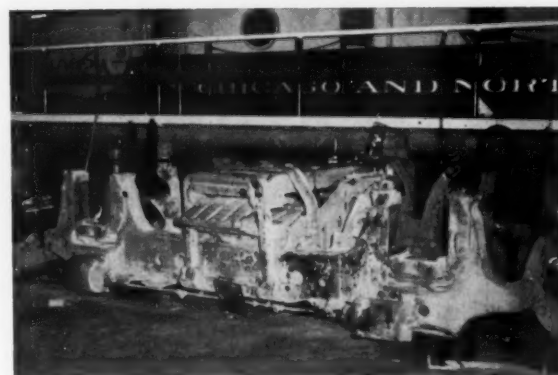


12. The same lifter places the wheel and traction motor assembly on blocks nearby for inspection.

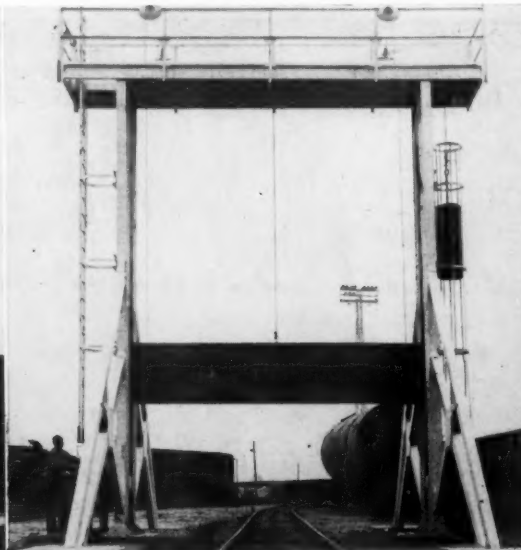
mounted turning fixture which supports the truck with the one pair of wheels a few inches off the floor.

The traction motor and wheel sets are removed together as a unit without having to remove the suspension blocks. This is made possible by the lifting arrangement used. It consists of three hooks on the ends of steel cables. One hook engages the center traction motor lifting lug, the other two fit around the wheel rims. One of the wheel hooks, painted yellow for proper identification, is on a slightly shorter cable than the other and fits over the wheel on the gear end.

The wheels are first raised slightly to clear the suspension blocks before the third cable is hooked on to the center traction motor lifting lugs. The wheels and traction motor are then lifted out as a unit from this point on and set on the floor nearby for further work.



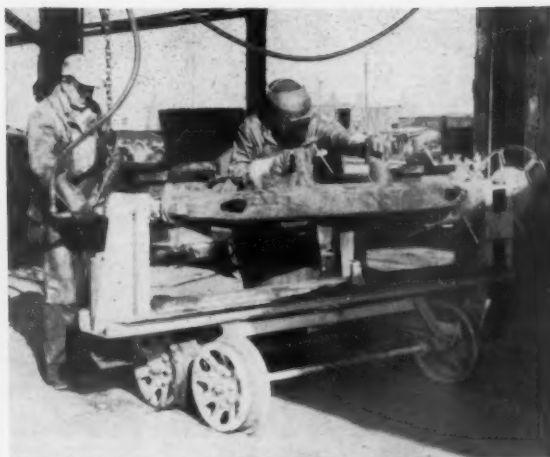
13. With the truck stripped and upside down, springs, wear liners and other parts are inspected and repaired.



Difficult load adjustments are made with this device at the Santa Fe car repair track, Argentine, Kan., in a few minutes as compared with several hours otherwise required. The strong well-braced construction and operating controls are shown at the left; counterbalance arrangement and crossbeam in lowered position, at the right.



Nearly completed cars wait on assembly line for decking while new frames wait for unloading.



Truck side-frame positioner for easy inspection, welding and drilling.

W P Completes Flat Car Program

Early in November, the Western Pacific initiated a program of building 102 50-ton, 50-ft. flat cars at the company shops, Sacramento, Cal., the work being completed in January of this year with an average production of about four cars a day and assembly time of 18 man-days a car. The cars featured all-welded steel underframes, shipped from the Consolidated Western Steel Corp. plant, Los Angeles, to Sacramento shops where finish welding and assembly operations were performed.



Applying stake pockets by welding to inverted underframe.





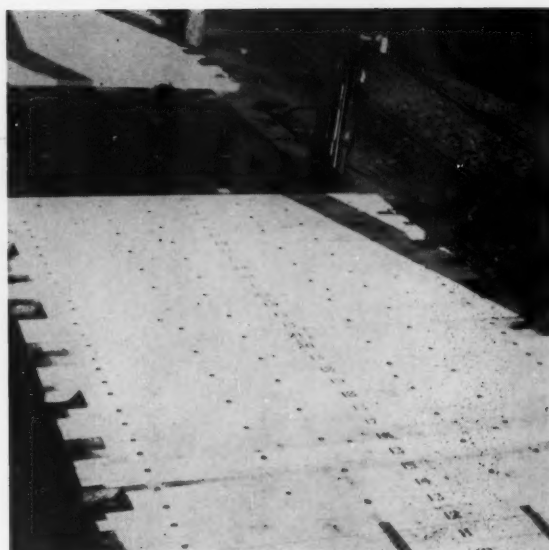
Riveting gangs putting on center plates, safety appliances, etc.



Small jib crane easily applicable to fork-lift truck for quick application of heavy parts, such as couplers and draft gears.

The trucks used for these cars are of 50-ton capacity, second-hand and reconditioned, salvaged from retired and dismantled 50-ton drop-bottom gondola cars. An ingenious truck side-frame positioner simplified and expedited the application of column wear plates, and contributed greatly to a more thorough and efficient inspection of truck side frames. As shown in one of the illustrations, the positioner is mounted on four flanged wheels for easy movement as required about the shop and the welded steel frame supports the side frame in such a way that it can be readily revolved by handwheel and pinned in any desired angular position for ready inspection, also quick and efficient down-hand welding, drilling, etc.

The bare underframes, exclusive of take pockets, center plates, striking castings, safety appliances and miscellaneous brackets, were purchased prefabricated. All detail parts, such as stake pockets, various brackets, brake levers, rods, etc., except specialties, were made at Sacramento shops. A well-planned method of assembly was



Deck boards, some cut to fit around side stake pockets, were precut and numbered, to permit easy assembly by matching identical numbers on the underframes.

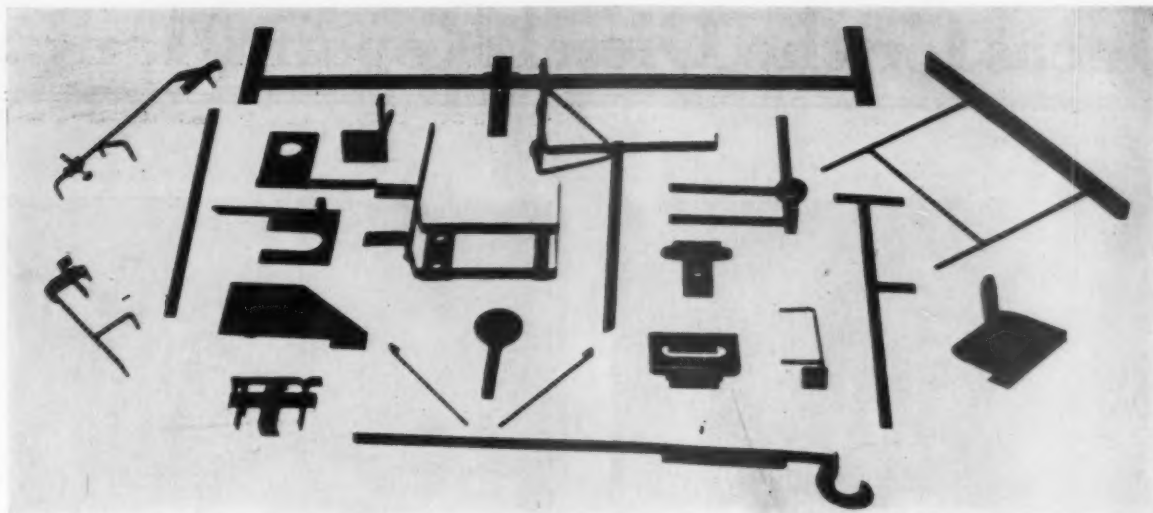
responsible for getting the cars out ahead of schedule.

The underframes, received in an upside-down position on flat cars equipped with special loading racks (3 underframes per car), were transferred by crane to timber skids where they remained inverted during application of all underneath equipment such as draft gears, couplers, center plates, stake pockets, striking castings, safety appliances, brake equipment, piping, etc. Welding was used wherever possible and riveting only when essential for such parts as center plates, safety appliances, etc.

All welding on the cars also was done in a position which would eliminate difficult overhead or vertical welding. After spray painting, the underframes were turned over, placed right side up on their own trucks, and moved along a final assembly line for welding on lading strap anchors, application of decking, painting, stencilling and a thorough final inspection before releasing for service.

The assembly of these cars was especially expedited by strategic location of all materials at the various assembly stations, which avoided duplicate and unnecessary handling, thus saving much time and expense. This handle-it-once system was made practicable only by close and willing cooperation between the mechanical and store departments. The appointment of a material man, whose sole duty was to distribute materials to their proper station points of application, accelerated progress by avoiding the necessity of mechanics leaving job location for procurement of the materials.

A novel type of swing-boom jib-crane, designed to operate as an attachment to a fork-lift truck, as illustrated, was used to transport heavy items such as draft gears, couplers, air reservoirs, brake valves, etc., from strategic storage areas to application points. The swing boom, which raises and lowers with the lift forks, made a convenient rig for quickly lowering heavy items into place on the underframes without time-consuming minor adjustments of truck position at the job and, of course, eliminating all heavy hand-lifting.



Some of the time-saving jigs and templates used in assembling cars.

Jigs and templates for locating the various brackets and equipment also played an important role in time saving and in providing duplicate accuracy. The widely-varying types of gages and templates used are shown in one of the illustrations.

Another time-saving assembly feature was the method of decking these cars. By numbered patterns taken off the sample car deck, it was possible to pre-cut by machine, each complete car set of decking to exact size and shape in the wood mill, thus avoiding all hand-cutting and fitting on the assembly line. Match marking each board and the location of each board on top of

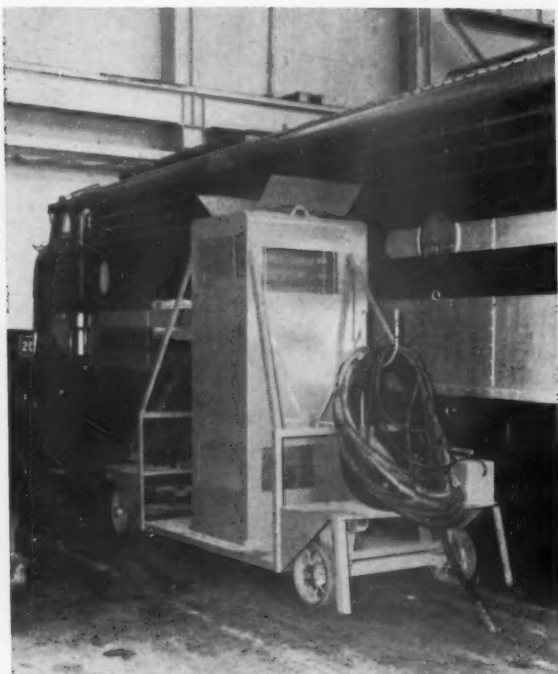
center sill with corresponding numbers stencilled on the underframe by use of a long paper tape stencil and spray brush made the application simple and fool proof.

An innovation in the design of these cars is the extension of $\frac{3}{4}$ in. top side-sill flange over and past the side-stake pockets with cutout to match each pocket opening. Pockets are made integral by continuous welding to side sill web and top flange, thus affording full protection to stake pocket against distortion. Lading strap anchors were applied at each stake pocket and at intermediate points between pockets in accordance with the latest AAR recommended practice.

Condenser fan used in new Trane dome-car air-conditioning system was among the exhibits displayed at the dedication of the "House of Weather Magic," the new Trane laboratory at La-Crosse, Wis. Hinges permit quick access to coil and allow fan and motor to be handled as a complete sub-assembly for routine maintenance.



Ideas for the Diesel Repair Man...



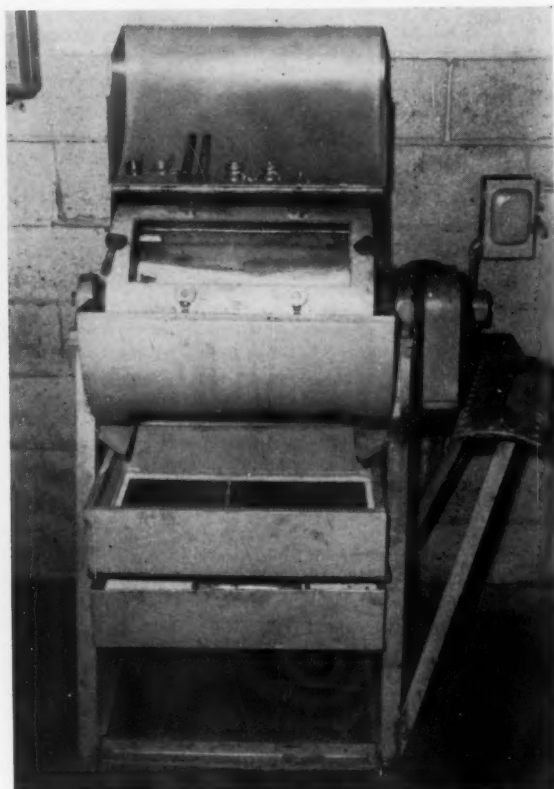
Load tester attached to a four-wheel carriage to facilitate moving it about.

■ **LOAD TESTER PUT ON WHEELS**—The Wabash has permanently attached its load tester at Decatur to a four-wheel carriage to facilitate moving it about. It is found easier and faster to move the load tester to the locomotive unit than to move the unit to a stationary load box. The meters are carried by hand, rather than being attached to the load box, to avoid damage by vibration when the box is being moved.

■ **CORN COB TUMBLING CLEANS MANY SMALL PARTS.**—Ground corn cobs are used for cleaning such miscellaneous small parts as springs, clips, small bolts, nuts and washers, as well as some of the larger electrical parts. The corn cob tumbling is used to do the final cleaning on the miscellaneous parts after they have first received a rough cleaning by immersing in a solvent and blowing dry.

About two hours of tumbling at 35 r.p.m. are required to complete the cleaning operation. The speed is kept to a maximum of 35 r.p.m. to avoid centrifugal action.

Experience has shown that 20-grit corn cob dust does the best job. Initially sawdust was tried, but this did not clean too well. Three 1-in. angle irons are welded axially around the inside circumference of the drum to increase agitation, improving the cleaning action and reducing the time required to complete the job.

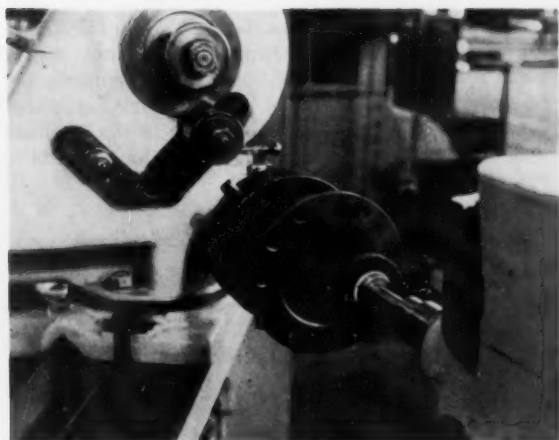


The corn cob tumbler cleans a load of miscellaneous small parts in two hours.



The cam latches that lock the rubber-gasketed loading lid and a partially emptied load after cleaning.

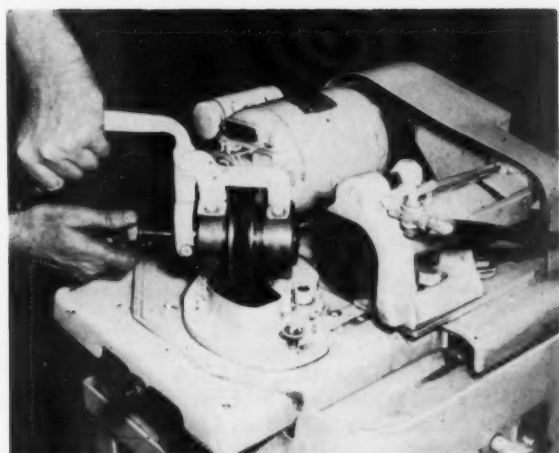
One of the principal problems that had to be overcome was the finding of a loading lid that could be closed tightly against the loss of the corn cob dust. This was solved by cam latches and a rubber gasket.



How a tool grinder is used to reclaim water-pump stationary bushings.

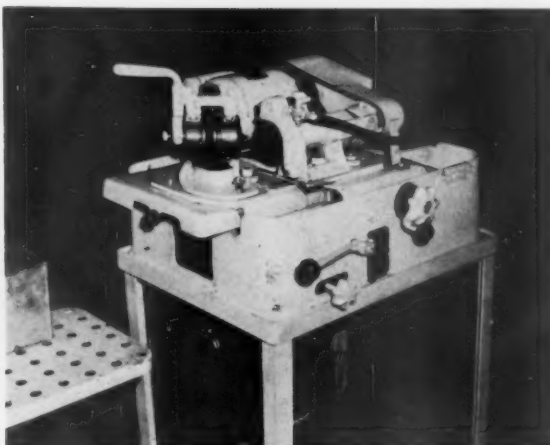
■ **RECLAIMING WATER PUMP STATIONARY BUSHINGS.**—Water pump stationary bushings need not be discarded when the inside face requires re-surfacing. This face can be refinished on a tool grinder using the flat side of an emery wheel.

The re-surfacing can be done until the graphite seal face is down to the level of the counterbore, which permits three or more resurfacing on the average bushing. The total time for the reclamation job is about 20 minutes.



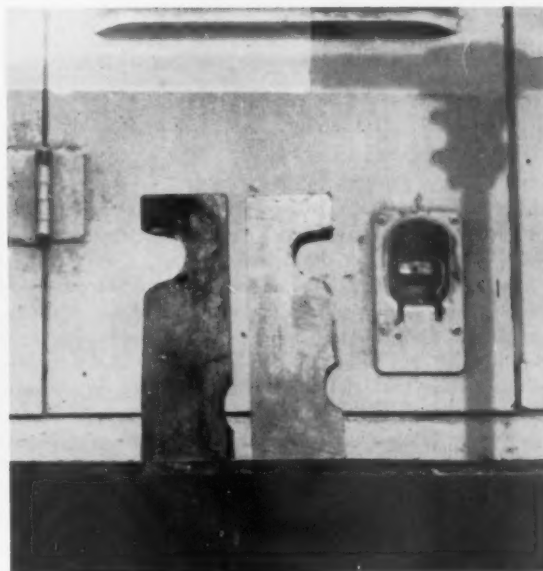
Modified valve grinder grinds 100 cylinder test valves in a half-hour.

■ **CYLINDER VALVE TEST GRINDING.**—By replacing the work head (the parts above the table top) on an old valve grinder, it is possible to grind approximately 100 cylinder test valves in 30 min. The grinding wheel was also moved to the left to permit proper lineup of the workpiece.



The valve is held by a spring collet and released for quick unloading and loading by depressing a lever.

The valve is held in place by a spring collet, which is released for reloading by depressing a lever. It is not necessary to stop the grinding wheel to load and unload. The valve is removed by the knurled handwheel on the end.



The flat surface knocks down the height, the small groove roughs out the top, and the form groove finishes the flange.

■ **CONTROLLING HIGH FLANGES.**—The Chicago & North Western has found that in many types of switching service the principal wheel wear requiring correction

Ideas for the Diesel Repair Man...



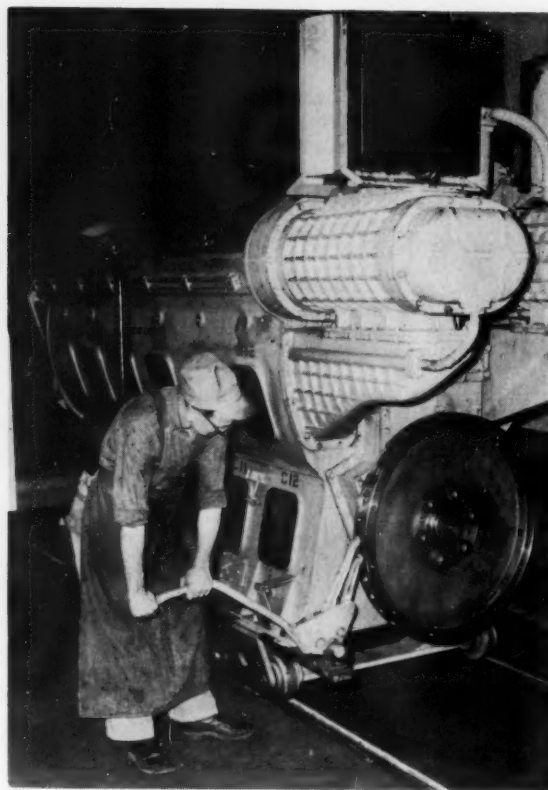
The forming tools re-flange four pair of wheels in six hours with the switcher moved under its own power.

is high flanges. The tread wear which does occur causes little change in the tread contour and requires correction much less often than the flange.

In those classes of service where the development of high flanges is the critical factor in wheel maintenance, the flanges are brought back to gage contour by a process reminiscent of the Lidgerwooding that was used on steam power to keep the driving wheel treads within gage limits. The essential difference between that procedure and what the North Western is now doing on diesel switchers is that the diesel is moved under its own power for the flange-cutting operation.

It requires about six hours to bring the high flanges on four pairs of wheels down to standard, with one pair of wheels being cut at a time. The work is done on a side track on which no other movements occur during the operation. The form tool used for the job is mounted on a holding fixture which fastens the brake shoe head. The tool is pressed against the flange by applying the brakes on the wheel pair being worked on, with the brakes on the remaining wheels cut out.

The required flange height is attained in three steps with a single tool. First, the flat part of the tool knocks the excess height off the flange. Second, the shallow notch roughs out the top of the flange. This notch may be on either the same side of the tool as the finish-forming groove or it may be on the back. In the third and final step the flange is finish-contoured by the forming tool.



Mounting brackets bolted to either side of the base permit easier turning of GM engines.

■ TURNING CRANK SHAFTS IN DIESEL ENGINES.—The crank shafts of Electro-Motive engines while in the shop for repairs can be revolved or turned to desired positions more easily, conveniently and safely by attaching a bracket to the bottom of the oil pan. This bracket supports the standard jack assembly or engine turner and the lugs on the bracket serve essentially as a safe holding device for the turner.

The two metal sections 1 in. by 4 in. by 2 ft. are bolted to the bottom of the frame on either side. A pair of lugs on each of these hold the turner for revolving the shaft. The lugs are 1 1/4 in. thick, 4 in. wide and 3 in. high.

ELECTRICAL SECTION

Motor Lead Switch Saves Time and Trouble

Originator of the knuckle-joint or "glad-hand" traction motor connector introduces a switch which eliminates taping and cleating leads

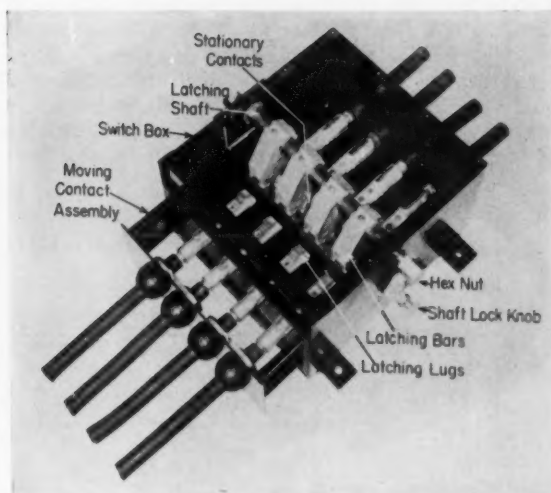


Fig. 1 (above)—Motor lead assembly inserted preparatory to latching.

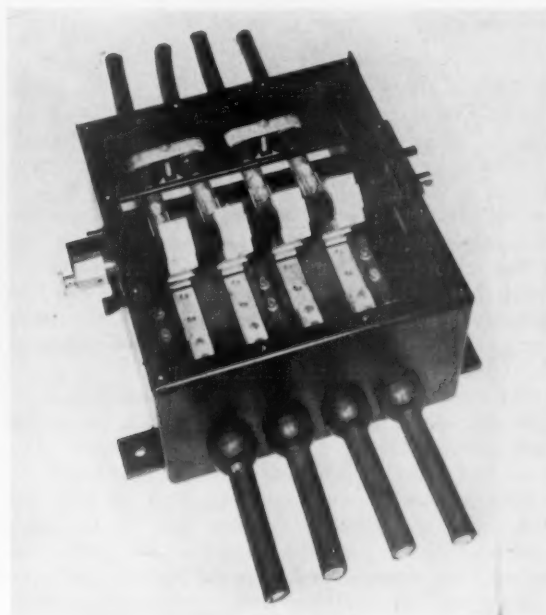


Fig. 2 (at right)—Motor lead assembly in latched position. No electrical connections have been made

A NEW TRACTION MOTOR DISCONNECT SWITCH has been designed by the Westinghouse Electric Corporation to enable quick and easy connection or disconnection of traction motor leads. The switch was designed for use on locomotives in the 1500- to 2400-hp range and has sufficient capacity to carry the current drawn by the largest traction motors now used on diesel-electric locomotives. In most cases, the terminals originally used on the locomotive can be bolted directly to the switch contacts. This universal use of the switch is made possible by using rubber bushings, contacts, and moving-contact support bars that differ as required by each cable size or type of terminal.

The basic components of the switch include a sheet steel box, stationary-contact assembly, motor-lead assembly

—Mr. Duchow is transportation engineer, Westinghouse Electric Corporation, East Pittsburgh, Pa.

By W. A. Duchow

and latching-shaft assembly. Total weight of the switch, less cable and cable terminals, is 111 lb. The weight of the motor-lead assembly, less cable and cable terminals, is 16 lb. The switch box is $17\frac{5}{8}$ in. long, $16\frac{1}{8}$ in. wide, and 9 in. deep.

The switch box is bolted to the locomotive underframe by mounting lugs located near each corner of the box. Rubber bushings are slipped over the four locomotive body cables and these cables, with terminals attached, are inserted through holes in one end of the switch box and bolted to the stationary contacts. The rubber bushings are slid forward on the cables to seal the entrance holes and prevent the cables from chafing.

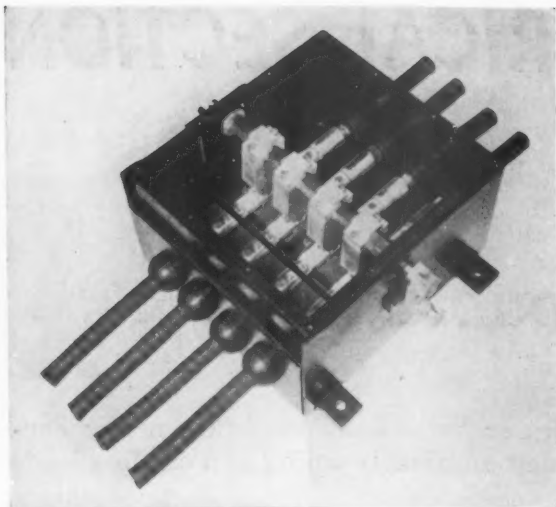


Fig. 3—Disconnect switch in closed position; electrical connection is completed.

The motor leads are fastened into the moving-contact assembly in a similar manner. The main difference is that the bolts which fasten the terminals to the contacts also bolt terminals and contacts to the moving-contact support bar. This bar holds the moving contacts in place and aligns them so they will mate properly with the stationary contacts.

The motor-lead assembly is then inserted into the switch box. Grooves on each side of the motor-lead assembly fit over steel runners on the inside of the switch box and properly position the assembly with respect to the stationary contacts and latching shaft.

The latching-shaft assembly may be locked in three positions: *closed*, *latch*, and *full-open*. It is put in the latch position to receive the motor-lead assembly. The motor-lead assembly is shoved sharply forward, and the sloping surface of each moving-contact latching lug strikes the spring-loaded latching bars of the latch assembly. As the bars slide up the sloping surface, the springs are compressed and, after the latching lugs move past the bars, the bars snap down preventing any backward movement of the motor-lead assembly. Forward movement is prevented by a bar across the back of each latching arm.

With the motor-lead assembly locked in the latch position, no electrical connections are made.

To complete the electrical connections and lock the switch in the closed position, it is only necessary to rotate the latching shaft to the closed position. To do this, it is only necessary to release the shaft lock by pulling out the knurled knob, turn the latching shaft, using a wrench on the hex nut located at the shaft end. When the shaft reaches the closed position, the shaft lock snaps into a hole, locking the shaft in position.

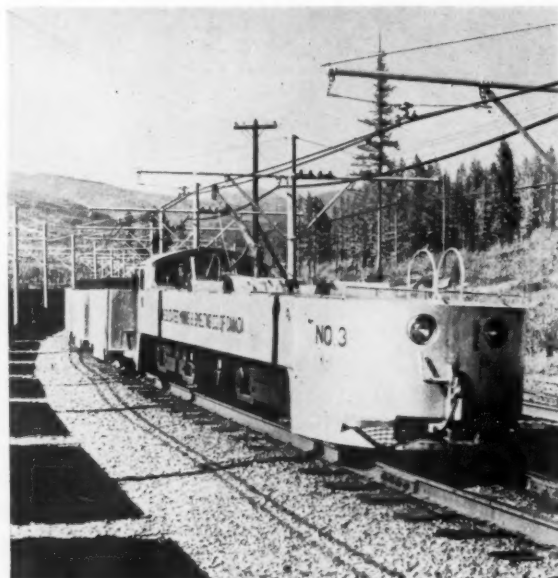
As the shaft is rotated from latch to closed position, the latching bars pull the motor-lead assembly into the box and contact pressure is gradually applied until full contact pressure is reached in the closed position. This gradual application of contact pressure gives a light pressure when the contacts are wiping together so that the contacts are self cleaning. Excessive friction between the

contacts is avoided by not applying full contact pressure until the switch is closed.

When the switch is closed, the end plate of the motor-lead assembly seats in a rubber sealing gasket making a moisture- and dirt-proof seal.

To electrically disconnect the traction motor leads when checking the locomotive for a ground, etc., the reversed sequence of operations is performed. As the shaft is turned toward the latch position, the motor-lead assembly moves back until the stationary and moving contacts are completely separated. The motor leads can be removed from the box by releasing the shaft lock, turning the shaft from the latched position to the full-open position. This lifts the latching bars clear of the assembly, permitting the removal of the motor lead assembly from the box.

The disconnect switch enables quick and easy connection or disconnection of traction motor leads by eliminating the need to insulate each motor lead connection and cleat the cables to the locomotive underframe. It is simple to electrically isolate a traction motor when checking the motor insulation or when searching for a grounded circuit. The motor lead assembly fits into the box in only one position. Therefore, there is no possibility of interchanging the motor leads when reconnecting a motor. Also, the motor lead terminals and contacts are protected by the sides of the motor-lead assembly when the motor is disconnected.



DYNAMIC BRAKING FOR DOWNHILL ORE HAULAGE. The 40-ton, 300-hp. haulage locomotive shown is one of three in operation at the Consolidated Mining and Smelting Company, Trail, British Columbia. Designed and built by the General Electric Company, these 250-volt electrics have a draw-bar pull of 20,000 lb. and are especially equipped for an unusual braking job.

The ore must be taken from the mine downgrade to the smelter, but for purposes of safety, the train must be kept within a maximum speed of 9.5 m.p.h. To do this, not only was dynamic braking installed, but the locomotives were made heavy as well. Another special feature of the locomotive is the heated operator's cab for severe winter conditions.

What's New in Locomotive Wiring

Locomotive wiring has long been a prolific source of trouble but improved wire and cable insulation, new tapes, better terminals, duct for wire and refined methods are making faults relatively uncommon

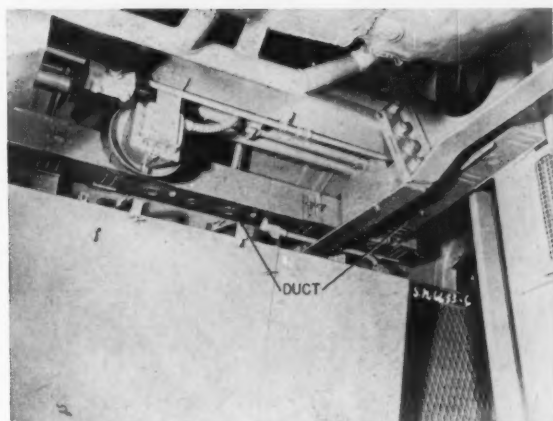


Fig. 2—Overhead wiring duct in position in locomotive cab.

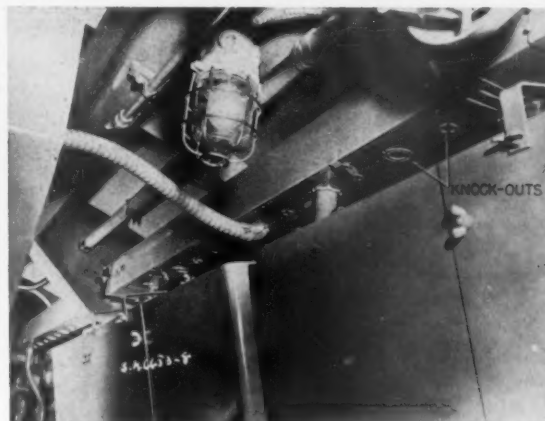


Fig. 3—Wiring duct showing knock-outs and two methods of taking off branch lines.

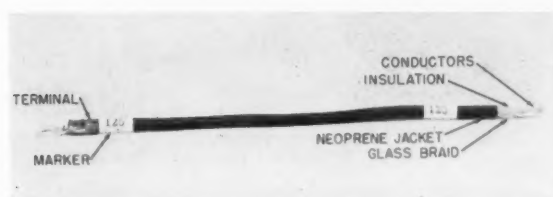


Fig. 1—New low-voltage control wire showing pre-insulated pressure-applied terminal, wire markers, and jacket cut away at one end to show insulation and glass-braid separator.

By W. S. O'Kelly and
W. F. Powers

SOME 15 YEARS have passed since the diesel-electric locomotive began to appear on the American railroads in significant numbers. Realizing the advantages of bringing these early locomotives up-to-date, a number of railroads have organized extensive modernization and rebuilding programs. As the average age of the diesel-electric locomotives operating on our railroads increases, such programs are bound to assume greater importance. Not only do they present the opportunity to install the latest and most efficient equipment, but they also permit advantage to be taken of progress in design and assembly methods.

Among other things, such a program offers the opportunity to make use of new wiring materials and techniques developed in recent years. Locomotive builders, encouraged by several railroads, have incorporated a number of new wiring developments in the latest designs of their locomotive units. The advantages of these

developments can readily be secured on older locomotives by appropriate modifications at the time of major overhaul. In this way, the motive power fleet can be progressively brought up to the new standards. For the sake of clarity, the improvements in wiring will be grouped under four heads.

Improved Wire and Cable

Changes have been made in the specifications for the wire and cable itself to provide better electrical and mechanical properties as well as to secure a marked decrease in deterioration under conditions of locomotive operation. For instance, the No. 14 and No. 16 sizes of wire widely used for low-voltage general purpose locomotive control wiring are now available with insulation like that developed for use on army tanks. This consists of synthetic rubber insulation, glass braid separator and neoprene jacket. The appearance and construction of this wire are illustrated in Fig. 1. Characterized by flexibility, good mechanical strength, and excellent ability

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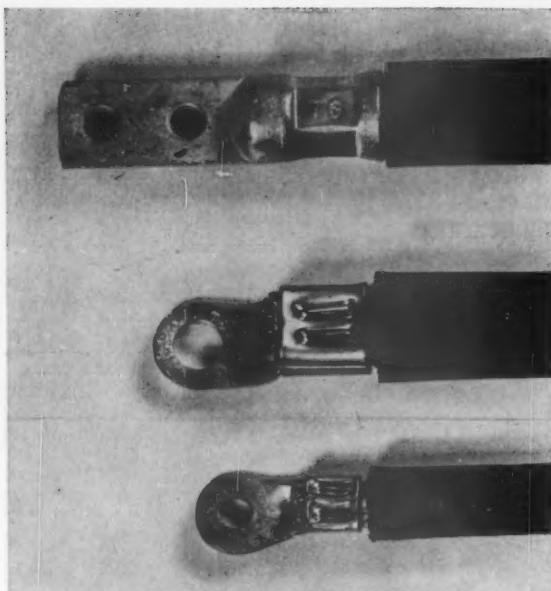


Fig. 4—Two types of pressure-applied terminals frequently used on cables.

to resist shouldering or bunching and abrasion, it is rated at 300 volts. The outside diameter for No. 16 is 0.13 in. and for No. 14 it is 0.16 in. Stripping is quick and relatively clean. The few strands of glass braid that occasionally remain are not at all troublesome.

Small panel-mounted resistors and certain other devices which dissipate heat are used at various points in locomotive control circuits. Where these are found, it is occasionally necessary to use connecting wire that is capable of withstanding medium high temperatures. For such applications, there is a fairly stiff stranded wire available. It is insulated with a layer of silicone-impregnated asbestos, a cellulose acetate separator, a second layer of silicone-impregnated asbestos, and a glass braid sheath treated with a silicone varnish. Like the new control wire, the rating of this type of wire is also 300 volts. It has the further advantage that its flame resistance improves with heat aging in normal use. This wire is now appearing in certain locomotive voltage control relays and will soon be found inside newly designed panels. It can be advantageously employed in rewiring jobs to improve the life of wires subjected to moderate degrees of heat.

For higher voltage applications—nominally 1,000 volts—a new rubber-neoprene cable has been developed which includes many improvements based on service experience. Available in sizes from No. 14 through 2750/24 its overall diameter is very near to that of the older varnished cambric type in all sizes. No. 16 in this specification is also available, but is rated at 600 volts. It can, therefore, be readily substituted for the older style cable in rebuilding and modernization work.

New Wire Location

A comparatively recent innovation in diesel-electric locomotive wiring installation is the practice of running the control wires overhead in a rectangular metal duct, as shown in Fig. 2. This duct is available in different

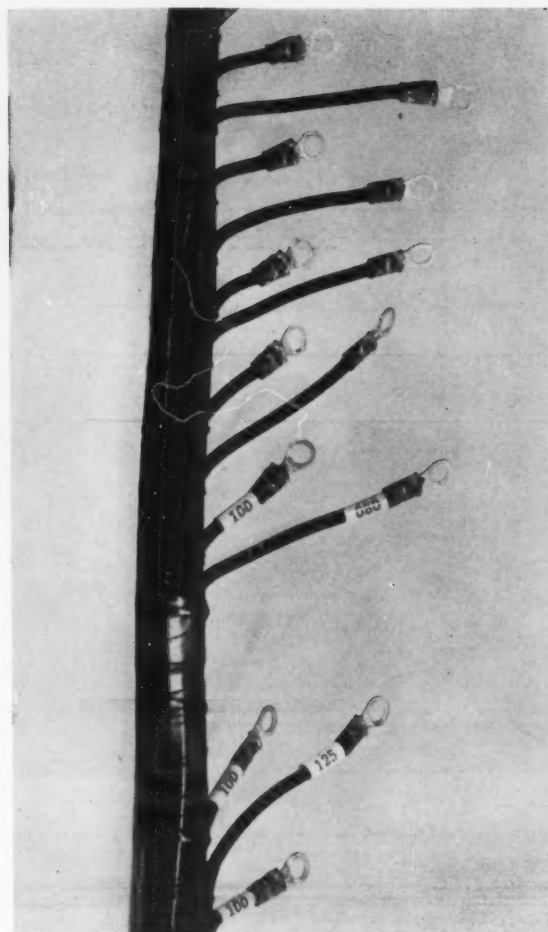


Fig. 5—Section of a wiring harness showing new style of tape, cording, markers and terminals.

cross-sectional sizes and lengths. It has hinged doors that allow access to any portion of the wiring. Individual wires are easily added if necessary. Adequate knock-outs are provided for lights, switches and other fixtures, as can be seen in Fig. 3.

The location of wiring overhead instead of under the cab floor has a number of distinct advantages. It improves accessibility and reduces contamination by oil, moisture and dirt. Holes in the underside of the rectangular duct allow ventilation. Moreover, cleaning agents used inside the cab do not normally reach the wires.

These advantages first led to the adoption of overhead wiring on new locomotives. They are now bringing it into more and more general use in rebuilding and modernization work.

Terminals and Marking

Improved mechanical methods of fastening terminals to wires have been developed. These have served to speed up wire installation and, at the same time, have provided junctions that are better both mechanically and electrically. The pressure type terminals, such as those illustrated in Fig. 4, are widely used today. Such terminals, together with ingenious and compact tools for

applying them easily, are available for all the standard sizes of wires. The terminal may also have a tough plastic sleeve, as shown in Fig. 5, that overlaps both the wire insulation and the terminal so that after application a neat, strong, well-protected joint results.

The importance of permanently legible wire marking can hardly be overemphasized. Unfortunately, it has not been given proper attention in the past. Now, however, good wire markers are available. Some of these can be easily applied to wire already in place and connected. This makes it possible to provide for complete and durable wire marking during modernization and rebuilding work, even though not all the wiring is renewed. As the new and improved wire markers become more widely known to the railroads, their use will increase. Some important characteristics to look for in a good marker are legibility, freedom from fading, resistance to erasure, ease of application and good retention. Preferably, the marker should be made of non-conducting material.

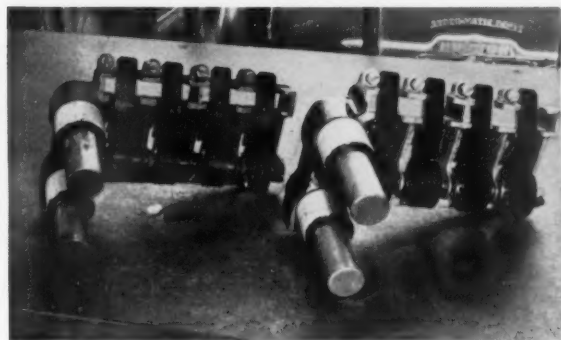
Improved Tapes

Another aid to better wiring has been the development of greatly improved insulating tapes. Made of silicone materials and possessing excellent adhesive properties these tapes are not affected by water or oil. These tapes make it possible for the workmen to produce a superior job, as illustrated by Fig. 5, in less time. Their smooth surface greatly simplifies the removal of de-

posits of oil-soaked dirt,—something practically impossible with the former cotton web or friction tapes.

The Weak Link

The old proverb, a chain is no stronger than its weakest link, might well be paraphrased for the railroader by saying, a locomotive is no better than its wiring. Rebuilding and modernization programs should, therefore, include measures to improve the wiring as well as the equipment. Chief among such measures are the use of new style wire and cable, installation of accessible overhead ducts, the use of new and better terminals, tapes and markers. These materials, applied with the latest techniques, will result in easier installation of accessible overhead ducts, the use of new and better terminals, tapes and markers. These materials, applied with the latest techniques, will result in easier installation and a better wiring job. This, in turn, will mean lower maintenance costs and less road detentions resulting from faulty wiring. In addition, a locomotive wired in the modern way is easier to keep clean, and any future wiring changes found necessary will be easier to make. Altogether, an intelligent and aggressive wiring program will result in appreciable betterment in both new and rebuilt locomotives.

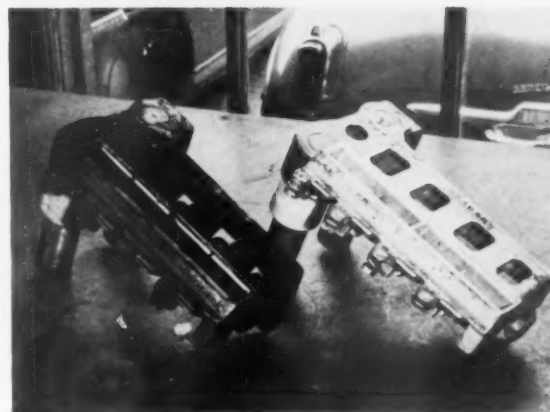
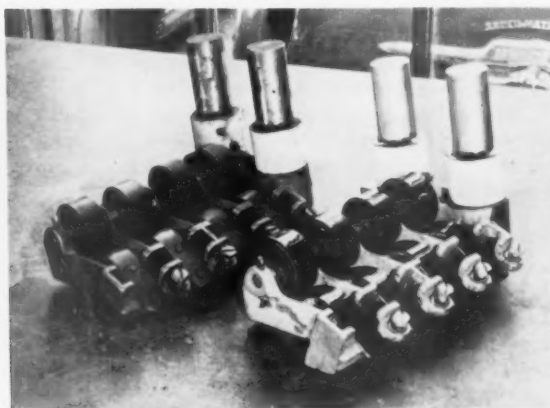


Clean Brush Rigging

Without Etching or Abrasion

Operators in the Milwaukee shops at Milwaukee, Wis., have developed a mixture of chemicals for cleaning metal parts which is highly effective for reconditioning traction motor and generator brushrigging. The process used does not etch or abrade the brushrigging metal, but removes all traces of grease, dirt and carbon contamination.

The cleaning solution consists of half Stanisol, a Standard Oil product, and half Lixsol (heavy), made by the L.I.X. Corporation, Kansas City, Mo. The solution is agitated either mechanically or with air and the parts to be cleaned are kept in the solution for an hour or more. The process is not used for coils or windings. Each of the three photographs shows brushrigging before and after cleaning with protective paint applied to the springs on the cleaned rigging.



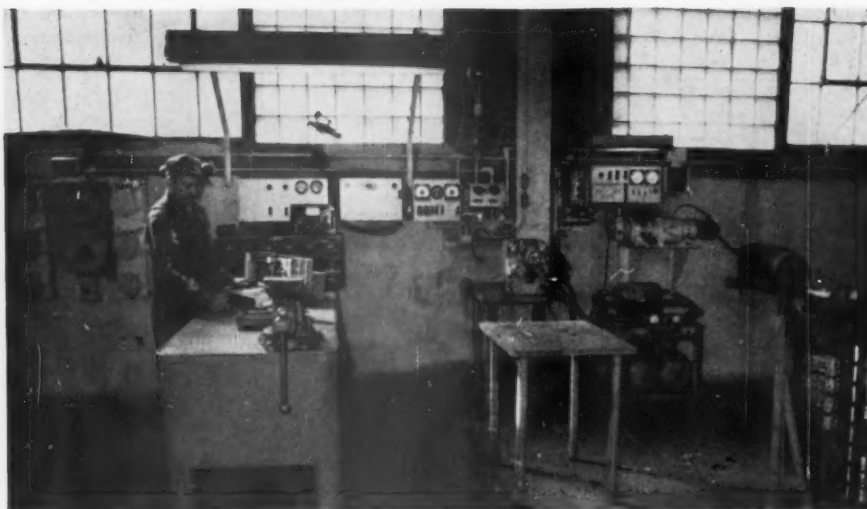
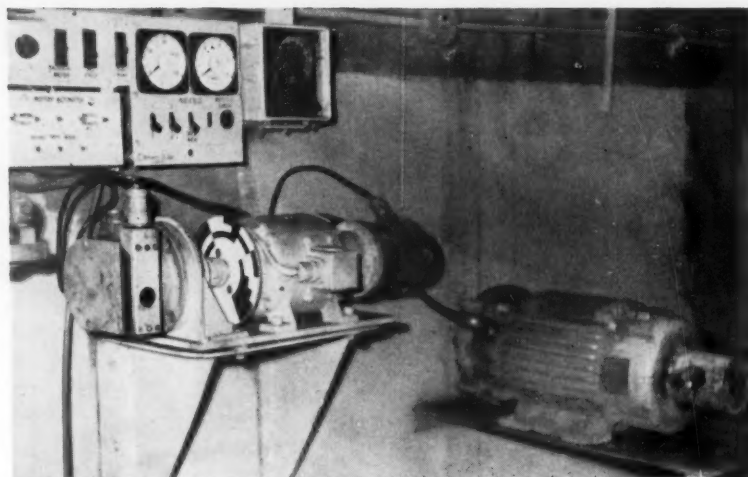


Fig. 1 (left)—General view of the Erie's locomotive control test panel at Marion, Ohio.

Fig. 2 (below)—Recent additions to the test panel for checking operation of tachometer generators and 400-cycle m.g. sets.

Tests for 400-Cycle and Tachometer Generators



THE ERIE's locomotive control test panel used at Marion, Ohio, and described originally in the December 1951 issue of *Railway Mechanical and Electrical Engineer*, has been extended to include means for testing General Electric tachometer generators and 400-cycle generators. A general view of the test stand is shown in Fig. 1, and the specific equipment for generator testing in Fig. 2.

On the upper left-hand panel in Fig. 2 are switches for the driving motor and the generators under test and a rheostat for controlling motor speed. This is accomplished by controlling the voltage of the generator (not shown) which supplies power to the motor. The lower left-hand panel provides contacts for making tests with bench meters.

The instruments on the center panel are, respectively, an a.c. voltmeter and an a.c. ammeter. Below the instruments are switches which provide for connecting phases separately to the instruments and connect or disconnect the 400-cycle and tachometer generator respectively. On the right-hand panel there is a tachometer.

The motor on the wall shelf is a 74-volt d.c. motor which drives the tachometer generator under test which is shown on the right directly connected to the motor.

The machine on the table is a 400-cycle m.g. set connected up for testing.

For testing the tachometer generator, the motor is run at 3,420 r.p.m. This speed is indicated by the frequency meter which reads in engine speed. A motor speed of 3,420 corresponds to an engine speed of 1,000 r.p.m. A closer check can be made by means of the black and white segments on the disc at the left end of the motor. This disc is on the motor shaft and under a 60-cycle fluorescent light, one ring of segments appears to stand still when the motor speed is 3,420 r.p.m.

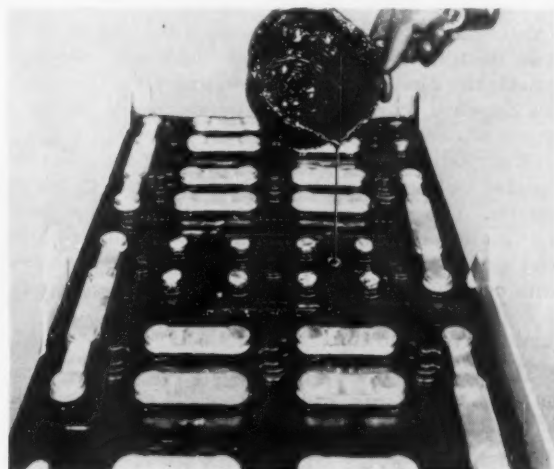
At this speed, the tachometer generator voltage should be 107. If the voltage is between 104 and 110, the generator is considered satisfactory. If it is outside this range, the engine will not load properly when the generator is applied to a locomotive and the engine speed will not be correct. In this case, the tachometer generator is returned to the manufacturer for overhaul.

For testing the 400-cycle m.g. set on the bench, its motor is supplied with direct current at exactly 74 volts. This power is obtained from a motor-driven generator which is a part of the test equipment. With the motor running from the 74-volt d.c. power, the generator is

loaded by means of a 1,000-watt, 120-volt incandescent lamp. The 400-cycle generator voltage should then be between 90 and 120 volts.

After the generator is applied to the locomotive, its voltage is set between 105 and 115.

The panel was developed by H. L. Dixon who is shown at the bench in Fig. 1. Behind him may be seen a jumper test panel. This will be described in a subsequent issue.



Eight Tips for Sealing Storage Battery Cells

Users of storage batteries sometimes find it necessary to remove the cover from a cell for internal inspection and repairs. In reassembling the cell unit, it is essential that a proper seal be obtained between the cover and the jar. Gould-National Batteries, Inc., offers these eight tips to good results:

1. Use the right compound. Ask your battery manufacturer what compound to use. In most cases battery makers will supply sealing compound packaged, ready for use.

2. To melt the compound, almost any convenient source of heat may be used such as a gas burner, electric hot plate or blow torch. Do not raise the temperature of the compound higher than necessary to permit easy pouring of the melted compound.

3. Do not permit the compound to burst into flames because burning consumes the oil in the compound. Loss of oil impairs its effectiveness. Too rapid heating and too high temperatures cause the compound to catch on fire.

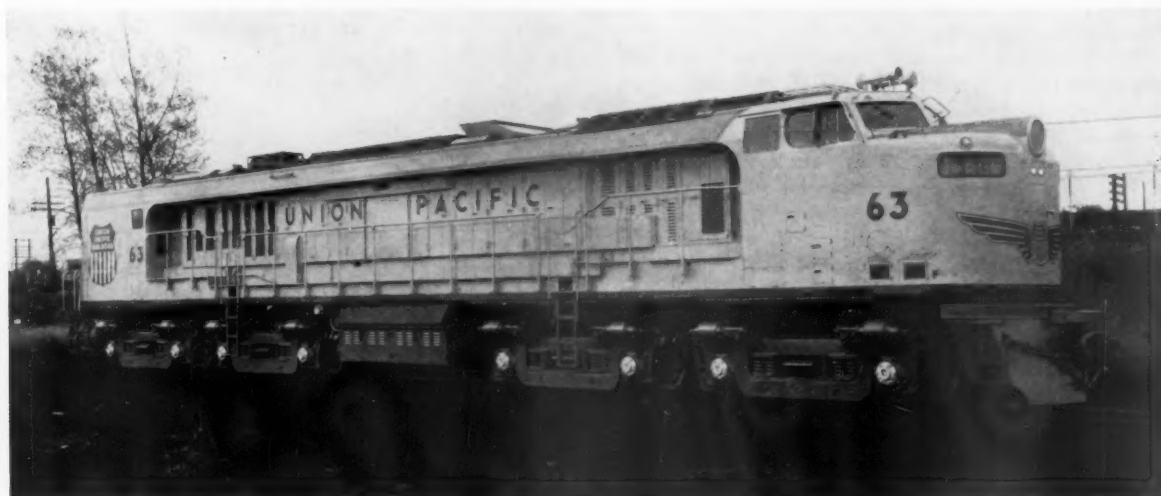
4. Almost any metal saucepan or aluminum coffee pot may be used to melt the compound. It is important, however, that the melting pot has good pouring lip so that the melted compound can be directed into place accurately with a minimum of spilling.

5. Do not use too large a pot because more time will be required completely to melt than a smaller batch. A container holding about one quart is generally used. If some compound remains after pouring a seal, it may be cooled, stored and reused. However, when the compound is being reheated, do not puncture the unmelted top layer with a screw driver or other pointed tool because pressure in the lower section of melted compound may cause hot, melted compound to squirt up through the hole. The hands, face or body of persons nearby may be severely burned.

6. Clean the surfaces to be sealed, neutralize with ammonia or baking soda and dry all surfaces carefully.

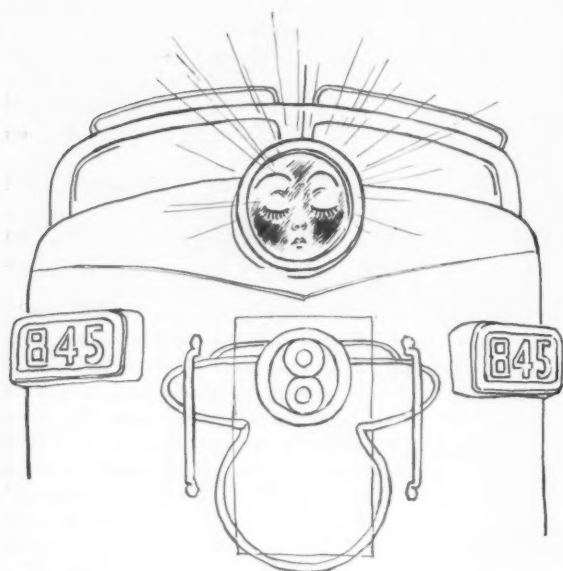
7. Be sure the cover is properly seated on top of the cell and is level with other cell covers in the battery.

8. Pour the sealing compound into the space between the cover and the jar being careful to avoid spilling. It is important to fill the space to the same level as the other cells in the battery so that there are no recesses where acid spray can collect. Use a sharp compound knife to smooth over rough spots and to remove excess compound after the compound has solidified.



Progress in gas-turbine-electric locomotive design. One of the three modified units recently delivered to Union Pacific by General Electric Company.

Special for Electricians



The Mars light was so embarrassed that it was still burning red.

By Gordon Taylor

The engineman on the streamliner is a very careful man. When he boarded the locomotive (a two-unit E-8 job), he checked the battery charging ammeter and also tested the headlight. Both checked okay.

He then ran the locomotive to the station several miles away and coupled on to the train. A little later, it was necessary to set an extra car in the train, and at that time the brakes went into an undesired emergency application. When that happened, the Mars signal light changed to the red position. The black out relay operated to open the circuit to the regular headlight.

The engineman recovered control of the brake, and was all set to go. When he received the departure signal, he moved the regular headlight switch to the bright position. Since it was early evening, he could not tell whether the headlight was burning, but he did notice that all the gage lights on the instrument panel were not burning.

Checking further he found that all lights on the lead unit were out with the exception of two classification lights and the Mars signal light. The Mars light was so embarrassed that it was still burning red.

The engineman phoned the diesel house to have an electrician meet the train in the shop yard to restore lighting service.

Two electricians were on hand when the train stopped in the yard. They tried everything they could think of but were unable to locate the trouble.

This series of articles is based on actual experiences of men who operate and maintain diesel-electric locomotives.

In the meantime, someone phoned the electrical foreman, who was at home, and when he arrived, the train had been delayed about one and a half hours.

The engineman told the foreman that if the Mars light could be made to burn white instead of red, that he would take the train out using the Mars light as a temporary headlight. The foreman was able to get the Mars light on the white position, and the train departed leaving a group of disconcerted maintainers.

The diesel house at the next division point (B) was notified to have an electrician meet the train to restore service. This notice gave the electrical foreman at point (B) an opportunity to study the situation, and when he and electrician met the train, the trouble was corrected with only three minutes delay.

Action Taken to Locate Trouble

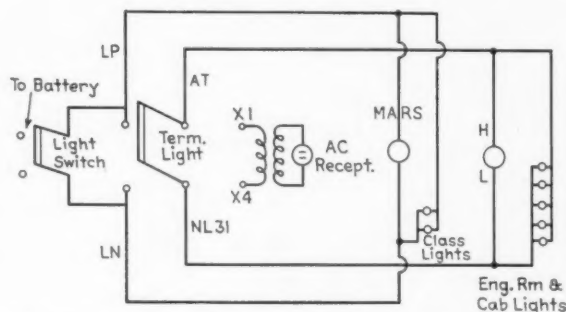
The foreman at division point (B) had one statement on which to base his plan. The statement was: "All lights have failed except the Mars light and two classification lights."

That statement caused him to wonder where the light circuits separated in a way that would permit all lights to fail except the Mars light and classification lights. The answer to that question was: check the terminal light switch.

Checking the wiring diagram, he found that if one of the wires on the terminal light switch was broken, all lights would fail except the Mars light and the classification lights.

When the locomotive arrived, he promptly removed the access cover above the terminal light switch. Removal of the cover disclosed a broken wire *NL-31*. The break was where the wire fastened to the terminal lug on the back of the switch. The electrician then skinned the end of wire *NL-31*, and made a wrapped connection to wire *LN*. This action completed the circuit with a temporary connection, and the locomotive was dispatched with only three minutes delay.

This case shows what can be done when you are following a plan of action. We may never have another case



Wiring connections at the terminal lighting switch on E-8 diesels.

of this kind, but since it happened once, it could happen again. It may happen to you—Be prepared!

Lesson to Be Learned

On many of our locomotives we have what is known as the terminal lighting switch. Its purpose is to provide a connection whereby locomotive light can be served from diesel house lighting service to relieve the battery from the light load while unit is tied up for repairs.

This switch is simply a double-pole, double-throw switch. Thrown one way, the lights are connected to the battery. Thrown the other way, the lights are connected to a small transformer, which is served by the house lighting circuit.

On E-8 locomotives, the terminal lighting switch is located on a panel at the rear of the cab, just back of the fireman's seat.

The wires leading to this switch are all concealed in a steel cabinet that is held by six screws. This plate provides an inspection door to gain access to the wires on the terminal lighting switch.

As shown in the diagram, there are six wires that attach to the switch. These wires are:

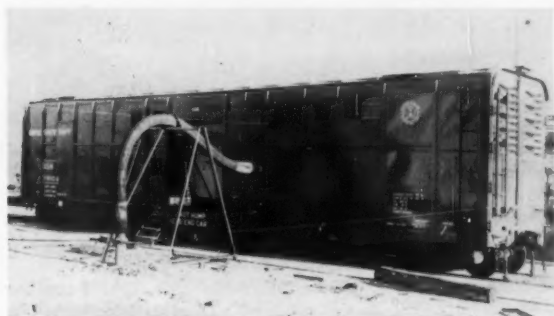
X1 and *X4*. These are the terminals of the a-c lighting circuit.

NL-31 and *AT*. These attach to the center pair of contacts or blades on the double-throw switch.

LN and *LP*. These wires, as their initials indicate, are negative light and positive light. They are the wires that connect with the storage battery on the locomotive. When the switch is thrown to that position, it connects wire *NL-31* to wire *LN*, and connects wire *AT* to *LP*. That provides light service to all lights on the locomotive except the Mars light and the two classification lights.

When the locomotive is in service, you need not worry about wires *X1* and *X4*. They connect to the transformer and are not in use when the locomotive is in operation. That leaves four wires to be concerned with.

If either *NL-31* or *LN* are broken from the switch, connect them together for temporary repairs. If either *AT* or *LP* are broken from the switch, connect them together for temporary repairs.



Car-Mounted Air Compressors.—A pair of heavy-duty air compressors, capable of supplying a combined volume of 5,000 cfm at a pressure of 125 psi, have been put on wheels for the Navy's Bureau of Yards and Docks, by Clark Brothers Company, of Olean, N. Y. Equipment on the 60-ft car weighs 130,000 lb, and includes 500-hp electric motors, switchboard, transformers and cooling and lubricating systems. The Navy will use the equipment, and probably more like it, for re-commissioning stored ships and to meet various emergency needs for compressed air. The mobile compressed air plant is shown at Charleston, S. C., where it was placed in service 25 hours after reaching the shipyard, supplying the air, in an emergency, to power the yard's essential air tools.

An Electrical Section Report . . .

Progress in Car Heating

Some definite thinking concerning the basic requirements of car heating has been done by members of the Electrical Section, Association of American Railroads, during the past two years. In its 1953 report, the Committee on Air Conditioning and Refrigeration prepared a general specification covering the heating of passenger trains. This specification states: "The system shall be kept simple and reliable both electrically and mechanically to thereby lower the cost of maintenance and reduce road failures to a minimum, but this should not be done at the expense of wide variations in car temperature."

A subcommittee of the Air Conditioning and Refrigeration Committee, headed by W. J. Madden, assistant engineer, Pennsylvania, has compiled a summary of recent developments which have been made to conform with the committee's specifications. This summary offers the following information: The recent improvements in car heating have been made with a view to simplifying the systems and providing more uniform car temperatures. In these simplified systems, steam from the train line is reduced to low pressure through a single pressure reducing valve and then fed to the floor and overhead heating coils through thermostatically controlled steam admission valve or valves. Condensate is voided through thermostatic traps.

The low pressure steam is usually supplied to the floor radiation at the center of the car. In these systems, the finned radiation contains an inner tube for supplying steam to the radiation. In one type, which is in satisfactory operation, the steam travels to the far end of the inner tube and returns as vapor and condensate through the outer tube to the trap. The rate of steam flow is controlled, as intermittent jets, to meet the heating requirements.

In another system, the inner tube has orifices located at fixed intervals of approximately 5 ft. to feed the low-pressure steam to the outer tube. These orifices are of graduated sizes according to their distances from the steam inlet and, in this manner, there is compensation for the pressure drop in the inner tube, thereby obtaining even heat distribution to the floor radiation. This system has been installed on a number of cars on several railroads. No road service data are available as to its merits due to the fact that it has been in use a comparatively short time.

Another type of simplified heating, known as the non-electric, which is in successful operation on several railroads, employs a bellows-type reducing valve to supply low pressure steam to the heating surface. The temperature control is accomplished by means of volatile liquid type thermostats actuating the steam admission valves, one for each side wall floor coil and one for the overhead heat. These thermostatically controlled valves have two thermal bulbs, one responsive to car temperature and the other responsive to outside air temperature. The bulbs responsive to outside air temperature function to keep the steam valves during the cooling season, and they also function in the winter season to raise the car temperature as the outside air temperature is decreased.

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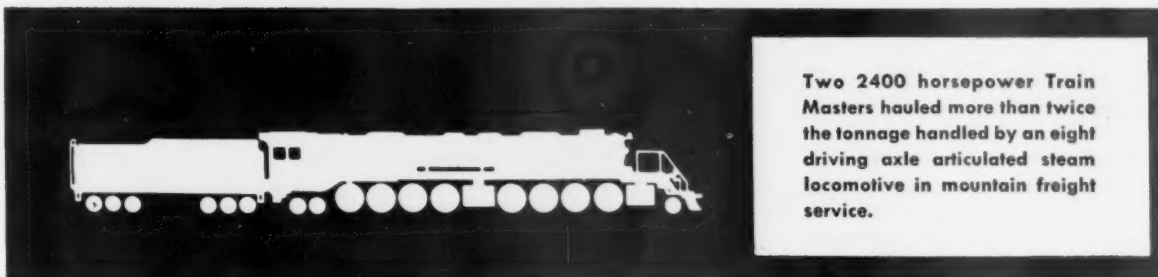
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Questions and Answers

General Motors

Diesel-Electric Locomotives

This is the first of a new series of Questions and Answers pertaining to General Motors diesel-electric locomotives. The references in italics in the text indicate where the original material may be found in the builder's technical publications or instruction manuals. These are usually available to authorized employees on each railroad.

General

G1-Q—In what service are the various types or models of General Motors diesel-electric locomotives used?

A—Freight and passenger road service and various kinds of switching service.

G2-Q—Why should the term "locomotive" be used with reference to the complete equipment rather than the term "engine"?

A—A locomotive consists of one or more units and a unit has one or more engines. For practical reasons, the word "engine" should be used only when referring to the originating mechanical power mechanism.

G3-Q—How many units does a locomotive consist of?

A—Depending upon the power requirements, the locomotive will be made up accordingly. For instance, if a unit is rated at 1,500 hp which may not be sufficient for the work assigned, additional units can be added to obtain the needed power.

G4-Q—How are the units designated?

A—Units with an operating cab are designated as A units and those without cabs are B or booster units.

G5-Q—What are the major sections of a diesel unit?

A—Diesel engine, electric generator, control apparatus, traction motors, car body and trucks.

Diesel Engine

G6-Q—Describe briefly, the engine used on diesel-electric locomotives.

A—The diesel engine, ranging from 6 to 16 cylinders is an internal combustion two-cycle V type, with 8½-in. bore and 10-in. stroke, having a compression ratio of 16 to 1. The two banks of cylinders are arranged with respect to each other at an angle of 45 degrees. Solid fuel injection is employed with an injector located in each cylinder head.

G7-Q—What is the diesel engine speed and how is it controlled?

A—The diesel engine has a speed range of 275 to 800 rpm which is controlled by a governor control system operated from the throttle at the engineman's control position.

Main Generator and Alternator

G8-Q—Where is the main generator located and how does it function?

A—The main generator is directly connected to the en-

gine crankshaft by a flexible coupling and converts the mechanical energy of the diesel engine to electrical energy (direct current) to operate the traction motors.

G9-Q—In what other way does the main generator function?

A—The main generator also acts as a motor to crank the diesel engine and is driven by current from the engine battery.

G10-Q—What is the function of the alternator?

A—The alternator section, built into the engine end of the generator frame, furnishes alternating current to drive the water cooling fans and traction motor blowers.

Auxiliary Generator

G11-Q—What is the purpose of the auxiliary generator?

A—The auxiliary generator, driven directly from the diesel engines produces direct current at approximately 74 volts to charge the storage battery and supply the low voltage circuits for lighting, control, generator field excitation, fuel pump operation, etc.

Control Apparatus

G12-Q—What controls the operation of the locomotive?

A—Throttle lever, reversing lever, transition lever or selector lever and the automatic and independent brake valves control the entire operation of the locomotive.

G13-Q—What systems are found on all diesel units?

A—Cooling, lubricating oil, fuel oil, air system and steam heating system (when used).

F7 and FP7 Locomotives—General

(Manual 2310, page 100)

G14-Q—What does the F7 locomotive consist of?

A—One or more units (A with operating cabs and B without cabs) rated at 1,500 hp per unit.

G15-Q—What is the difference between the General Motors F7 and FP7 locomotives?

A—The General Motors FP7 locomotive is only built as an A unit and is exactly comparable to the A units of the F7 type except that it is built four feet longer to provide additional steam generator water capacity.

G16-Q—What is the size and model of the engine used with this type locomotive?

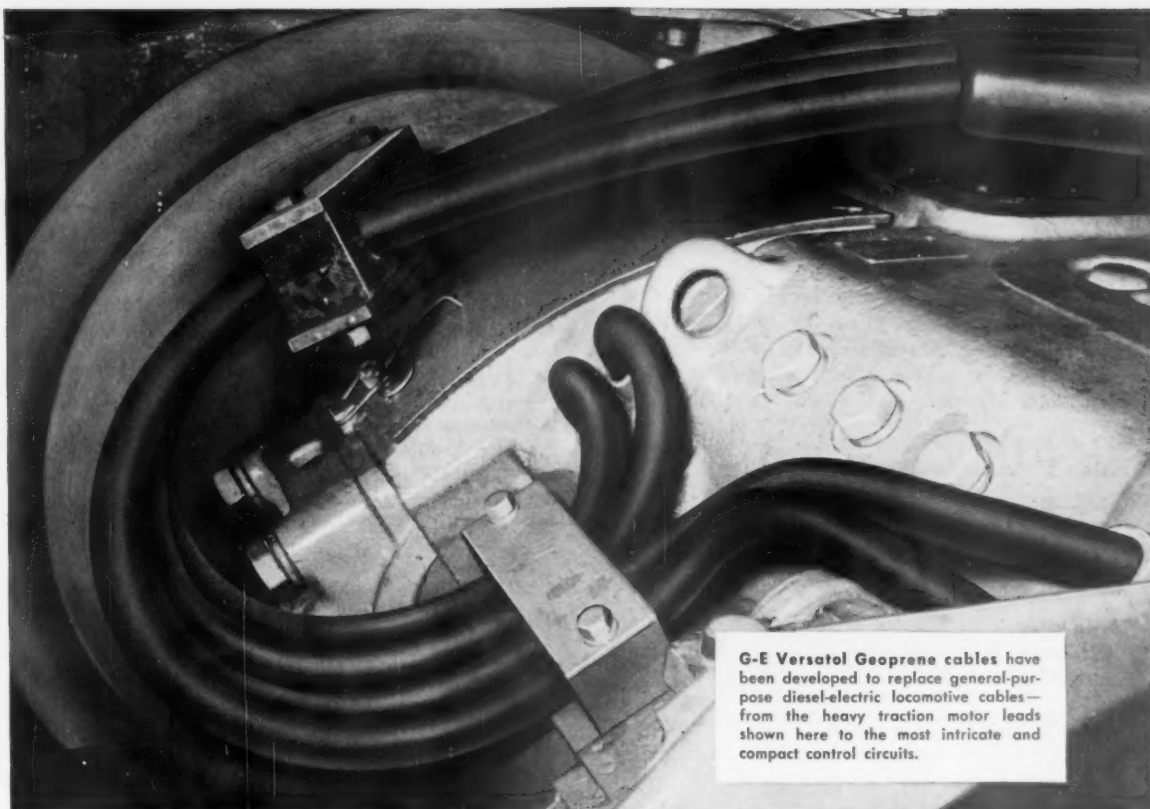
A—This locomotive is equipped with a General Motors 16-cylinder Model 567B diesel engine.

Main Generator and Alternator Assembly

G17-Q—Describe this assembly.

A—The D-12 main generator and the D-14 alternator assembly is directly connected to the engine flywheel. These two electrically-separate sections are mounted on the same shaft.

(Continued on page 66)



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Questions and Answers

G18-Q—Describe the D-12 assembly.

A—The D-12 portion furnishes direct current at a nominal 600 volts to the traction motors. The D-12 main generator is a constant-kw generator which at full throttle delivers approximately 1064 kw to the traction motors.

G19-Q—Describe the D-14 section.

A—The D-14 section, built onto the engine end of the generator frame is a three-phase 80 kw (100 KVA at 0.8 PF) alternating current generator which furnishes power to drive the engine water cooling fans and the traction motor blowers.

Traction Motors

G20-Q—How many traction motors are in each unit and what model?

A—Four Model-D-27 traction motors are in each unit mounted, one on each axle.

G21-Q—How is the traction motor connected?

A—Each motor is geared to the axle which it drives, by a motor pinion gear meshing with an axle gear.

G22-Q—What is the gear ratio?

A—The gear ratio is expressed in a double number such as 62/15. In this case the axle gear has 62 teeth while the pinion has 15 teeth.

G23-Q—During acceleration how many steps of traction motor electrical connections are used and what is the operation called?

A—Four, and the operation is called transition.

G24-Q—Name these steps in their order.

A—(1) Series-parallel; (2) series parallel-shunt; (3) parallel and (4) parallel-shunt.

Auxiliary Equipment

G25-Q—Are belt drives used on this locomotive?

A—Belt drives are not used on the Model F7 or FP7 locomotives.

G26-Q—How is auxiliary equipment driven on these locomotives?

A—By direct drive from the engine or by separate electric motors.

G27-Q—What type auxiliary generator is used?

A—Locomotives with steam generators are equipped with an 18 kw auxiliary generator. Others have a 10 kw auxiliary generator.

G28-Q—From where is the auxiliary generator driven and what does it produce?

A—The auxiliary generator is driven directly from the rear gear train of the engine through flexible couplings and produces direct current at 74 volts to charge the storage battery and supply the low voltage circuits for lighting, control, external main generator battery field excitation, fuel pump operation, etc.

G29-Q—What is provided for traction motor cooling?

A—A 5 hp electric driven blower is provided for each traction motor.

G30-Q—How is the air supplied for the engine cooling water radiators?

A—For this purpose four 9 hp electric driven cooling fans thermostatically controlled are provided.

Operating Controls

THROTTLE LEVER

G31-Q—What does the throttle lever control and how are the positions shown?

A—The throttle lever controls the speed of the engines and the train speed in normal operation. The throttle positions are shown in an illuminated dial indicator above the lever.

G32-Q—What are the throttle positions?

A—The throttle has 10 positions: STOP, IDLE, and RUNNING speeds 1 to 8.

Schedule 24 RL Air Brakes

1746-Q.—What takes place after the expiration of the time delay?

A—When the discharge current falls below the release value of relay *W*, this relay will drop out.

1747-Q.—With the dropping out of this relay, what happens?

A—This will allow relay *Y* to drop out.

1748-Q.—What circuit is completed when relay *Y* drops out?

A—This completes the circuit for energizing relay *X*.

1749-Q.—Explain the action further.

A—Condenser *C2A* has already been charged to full battery voltage because contacts *B6-B7* of relay *V* closed when the relay moved to its right hand position.

1750-Q.—What then happens?

A—Relay *Y* then again becomes energized and since relay *X* is in its energized position, current will be supplied to the lower coil of relay *V*, thus moving its contacts to the left hand position.

1751-Q.—What is the action resulting from movement of the contacts to the left hand position?

A—Battery current is then disconnected from condenser *C2A* and it will discharge through the coil of relay *X*.

1752-Q.—What limits this discharge current?

A—Resistor *R14A*.

1753-Q.—What takes place when the discharge current falls below the release value of relay *X*?

A—This relay will release and the cycle will have been completed.

1754-Q.—Referring to resistors R7 and R11, where may the explanation for their use be found?

A.—Plate 9 explains the use of these two resistors.

1755-Q.—As this will be somewhat difficult to understand, what must be done to simplify the explanation?

A.—If the reader will visualize the electro-pneumatic brake equipment with the master controller, he will realize that the magnet valves shown on the diagram are energized when a brake application is made; therefore battery positive is connected to the lower terminals of the magnet valves shown on the diagram.

1756-Q.—What is the result if relay X is energized at this particular instant?

A.—There is a direct connection between B+ connected to the lower terminals of the magnet valves and B— of the bridge and the result is a short-circuit.

1757-Q.—Under these conditions, how is the current flow limited?

A.—By the use of resistors R11 and R7.

Fairbanks-Morse

Diesel-Electric Locomotives

This is the first of a new series of questions and answers pertaining to Fairbanks-Morse diesel-electric locomotives. The references in italics indicate where the original material may be found in the builder's technical publications or instruction manuals. These are usually available to authorized employees on each railroad.—Editor

General

F1-Q.—In what service may these locomotives be used?

A.—They can be used to freight, passenger and switching service.

F2-Q.—What does the road locomotive consist of?

A.—It consists of uniformly built units in which the power plant size may be varied. The road locomotive generally consists of two A and one B unit.

F3-Q.—Can the switcher type be used in multiple unit operation?

A.—Yes.

F4-Q.—In order to function properly in multiple, what provision must always be carried out?

A.—All air connections must be coupled, properly mated and interunit jumpers coupled and they must match each other.

F5-Q.—What constitutes the major sections of a diesel locomotive?

A.—(1) Diesel engine; (2) electric generator; (3) control apparatus; (4) traction motors; (5) car body; (6) trucks.

F6-Q.—What is the horsepower and number of cylinders of the engines on the various units to be discussed?

A.—Horsepower—1,200, 1,600, 2,000 and 2,400
No. of Cylinders—8, 10 and 12

Diesel Engine

(Bulletin 1706-101A, p. 4)

F7-Q.—What type engine is used on these units?

A.—The engine is of the opposed piston type, two pistons working vertically toward each other in the same cylinder.

F8-Q.—Are valves or cylinder heads required?

A.—No valves or cylinder heads are used.

F9-Q.—Are the opposing pistons connected to the same crankshaft?

A.—No. The upper and lower pistons drive separate crankshafts which are interconnected by a vertical drive shaft and gears with a suitable flexible coupling of coil spring design.

F10-Q.—Do the two crankshafts each furnish an equal share of the power developed?

A.—No. The lower crankshaft leads the upper in timing by 15 degrees, which is known as the LOWER CRANK LEAD and which causes the lower shaft to furnish 80% of the power developed.

F11-Q.—What is the principle of the diesel engine operation?

A.—The diesel engine operates on the two cycle principle (details of which will be discussed later on).

Main Generator

(Bulletin 1706-101A, p. 6)

F12-Q.—Where is the main generator located?

A.—The main generator is connected directly to the engine crankshaft through a flexible coupling.

F13-Q.—What is the principal function of the main generator?

A.—To furnish power to the traction motors.

F14-Q.—For what other purpose is the main generator utilized?

A.—It is also used as a starting motor for the diesel engine.

F15-Q.—How is this done?

A.—By connecting the storage battery to the generator starting field and armature.

Alternator

F16-Q.—Where is the alternator located?

A.—The alternator is mounted on an extension of the air compressor shaft, compressor fly-wheel.

F17-Q.—How does the alternator function?

A.—To furnish alternating current power to the traction motor blowers and radiator cooling fan motors.

F18-Q.—Where are these machines mounted and how are they driven?

A.—These machines, in some cases, are mounted on a common armature shaft atop the main generator and are driven by a V-belt assembly from the main generator shaft. Other installations are separate.

F19-Q.—What is the function of the exciter?

A.—The exciter furnishes main generator excitation.

F20-Q.—What is the duty of the auxiliary generator?

A.—The auxiliary generator provides direct current power for controls, battery charging and lighting.

F21-Q.—For what voltage is the auxiliary generator regulated, and how?

A.—72 volts at idling, 75 volts at full engine speed, by the voltage regulator.

Air Compressor

(Bulletin 1706-101A, p. 7)

F22-Q—How is the air compressor driven?

A—At engine speed through a flexible coupling to the main generator shaft.

F23-Q—What is its capacity and horsepower?

A—262 cfm at full engine speed and 92 cfm at idle engine speed. Maximum horsepower is 70.

Dynamic Braking

F24-Q—Can the various locomotives be equipped for dynamic braking?

A—Yes, when specified by the railroad.

F25-Q—Describe briefly, the operation.

A—When operating in dynamic braking the traction motors operate as generators. The current generated is dissipated in grids in roof hatch behind operating cab.

F26-Q—What does part of the current operate?

A—Part of the current operates the motor-driven grid cooling fan.

Locomotive Controls

F27-Q—What comprises the locomotive controls?

A—The throttle lever, reversing lever or reverser and selector lever, on the controller, and the automatic and independent brake valves control all locomotive operation.

F28-Q—What must first be in proper position for the controls to function?

A—Breakers and switches.

Throttle Control

F29-Q—What kinds of throttle control are used?

A—Electric control and pneumatic throttle control.

Interchange Rules

This is the seventh installment of a series of questions and answers on the Association of American Railroads Code of Rules Governing the Condition of, and Repairs to, Freight and Passenger Cars for the Interchange of Traffic which may help car men clarify their understanding of the philosophy, intent and requirement of the Interchange Rules. The answers given to the questions are not to be considered interpretations of the rules of Interchange, which can only be rendered by the Arbitration Committee acting officially. The comments, however, come from a background of intimate association with the application of the rules. Obviously, comments or opinions as of today, may be inapplicable after a revision of the rules or further interpretations by the Arbitration Committee.—Editor.

91-Q—Where all of the repairs listed on billing repair cards are properly chargeable versus car owner, is it necessary to specify "Bill Owner" at top of such billing repair cards?

A—Revised A.A.R. "Regulations Governing Inspection and Repairs of Foreign Freight Cars and Billing Therefor" do not require that billing repair cards be marked "Bill Owner" where they cover only repairs to owner's defects.

92-Q—Is it intended that each road shall adopt an overall system whereby all accidents, derailments and other unfair usage cases involving foreign cars shall be completely investigated to prevent improper billing for resultant repairs or improper assessment of responsibility for resultant damage versus the car owner?

A—Under the present rules and regulations, exceptions would be taken by A.A.R. Mechanical Inspectors on any road where its method of investigating responsibility on damaged foreign cars does not conform in principle to Section IV, Paragraphs 4 to 7, inclusive, of the A.A.R. "Regulations Governing Inspection and Repairs of Foreign Freight Cars and Billing Therefor."

93-Q—Is it permissible for the receiving road to return loaded express refrigerator cars to delivering line account overdate stenciling on car for journal box repacking?

A—No, such practice would be in violation of the intent of Passenger Car Rule 2.

94-Q—Where repairs are made under handling line responsibility and bolts are used in place of rivets to secure ladders, ladder treads, hand holds, sill steps and uncoupling lever brackets, is the issuance of defect card in order?

A—No.

95-Q—Under what conditions can brake beam be continued in service notwithstanding one or both heads worn so that the distance between upper and lower brake shoe lugs exceeds 2¼ inches?

A—By the use of an approved design wear plate, provided such application restores the aforementioned dimension to 2¼ inches or less.

96-Q—Where car owner receives defect card for holes of excessive dimensions cut in top chord angle of car, must the entire chord angle be renewed to justify charge or is charge permissible on the basis of filling up such holes by welding?

A—Car owner may elect to make repairs by straight welding or by insertion of metal plug in each hole and welding around circumference thereof, for which charge may be made per Item 181 of Rule 107.

97-Q—Why is it important for handling line to immediately check the load weight carried versus the stenciled load limit on car in cases where car underframe collapses?

A—Because if it develops that car was overloaded and other unfair usage was not involved, responsibility for resultant car damage would rest with the original road haul carrier under the conditions described in Paragraph (10-h) of Rule 32.

98-Q—What obligation should be assumed by the handling line where car suitable for hauling grain prior to last loading is unloaded and contamination damage as outlined in Paragraph (12-a) of Rule 32 is discovered, it being established that contaminating commodity was loaded into such car by another railroad?

A—Road having car in its possession should attach information card to car (as information only) indicating the facts and waybill data for such shipment, as the first step in assisting the car owner to properly place responsibility upon the road which wrongfully loaded the car.

99-Q—Why is it to the interest of car owner to have its cars reweighed upon completion of extensive repairs made on authority of defect cards?

A—Because where weight of each car so repaired is changed 300 lbs or more (for refrigerator cars 500 lbs or more) the expense of re-light-weighting and re-marking is chargeable to the road which issued the defect card, unless the car happens to be due for reweighing per Paragraph (1), Section (B) of Rule 30.

100-Q—Note 6 following Section (1) of Rule 60 requires the renewal of air hose gaskets when air brakes receive periodic attention; may separate charge be made for such gaskets where so renewed?

A—No, this expense is included in the average allowances which are chargeable in connection with C.O.T. & S. of air brakes.

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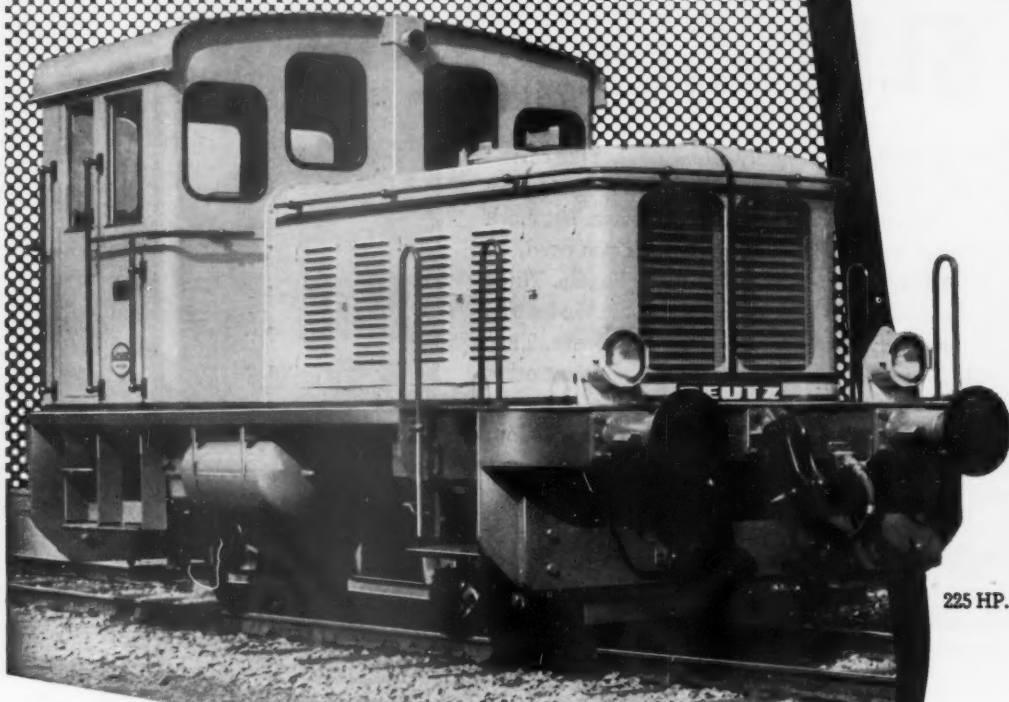
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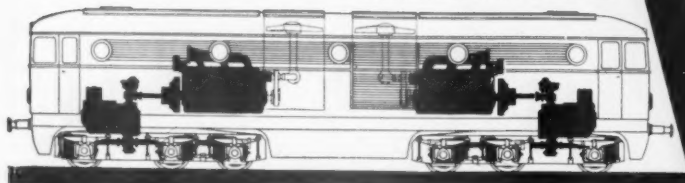


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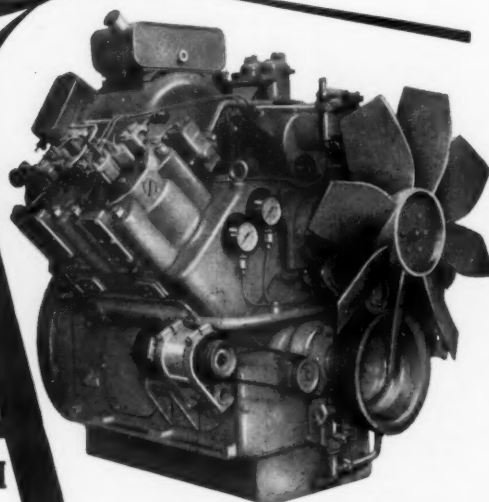
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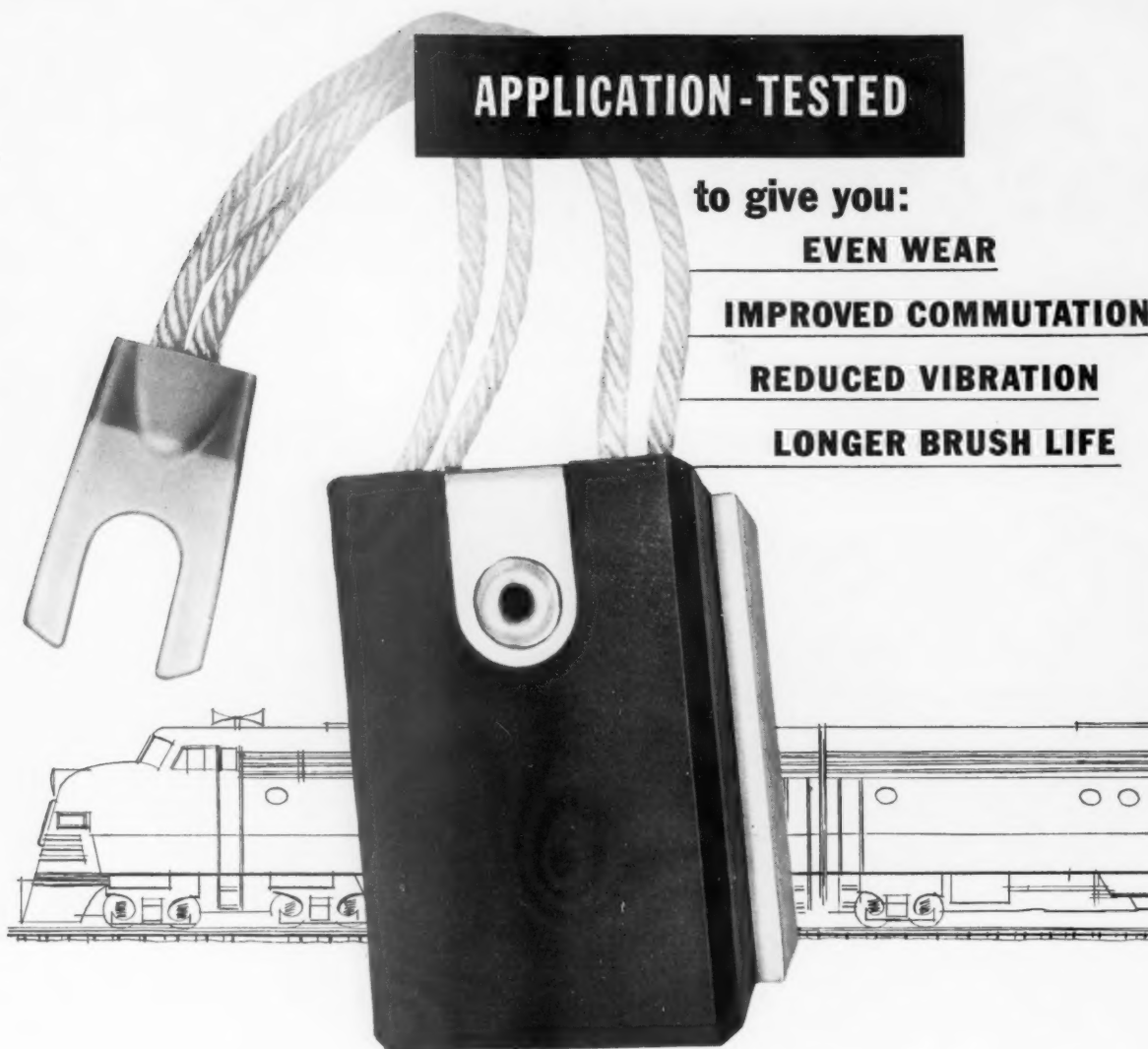
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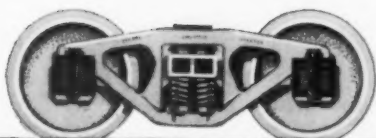
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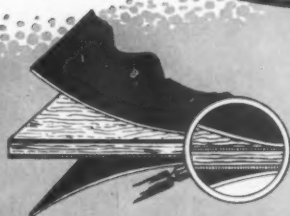


DOORS • SIDE PANELS
BULKHEADS and PARTITIONS
in This Luxury Car are **73% Lighter**
Than Standard Steel Construction . . .

...because they are **MET-L-WOOD**

● Met-L-Wood, used in passenger cars, locomotives and baggage cars cuts deadweight to a minimum consistent with specified strengths, stiffnesses and durability. As an example, Type 2P2-3/8" Met-L-Wood, used in side panels and partitions has the stiffness of 1/4" steel plate—yet weighs only 2.6 lbs./sq. ft. as against 10 lbs./sq. ft. for 1/4" steel plate!

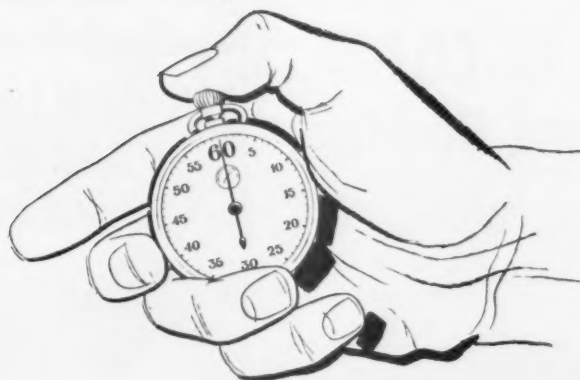
Whether you require prefabricated Met-L-Wood units to your specifications, or can use stock sizes and finishes, the basic utility and economy of Met-L-Wood for railroad rolling stock construction is worth investigating . . . today. Write for details on your specific requirements. Our engineering staff will gladly assist you in adapting Met-L-Wood versatility to your needs.



MET-L-WOOD CORPORATION

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MET-L-WOOD • STRONG... LIGHT... Smooth Finish... Sound Deadening... Fire-Resisting... Insulating



GOT A MINUTE?

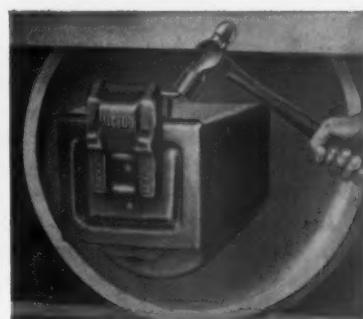
**It takes even less to install Alcolid
and it's set for a Lifetime!**



FIRST . . . align holes in the lid with holes in box and insert the square-headed retaining pin



THEN . . . push the lid down to put spring under pressure and withdraw the shipping pin



FINALLY . . . close the lid by pushing all the way down. Bend ear over head of the retaining pin

NO PIN ROTATION—NO EYE ELONGATION

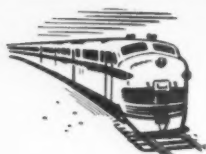
Your Alco sales representative will be glad to give you full information.

ALCOLID[®]

AMERICAN LOCOMOTIVE COMPANY

Sales and Service Offices in Principal Cities

Order EX-CELL-O Pins and Bushings From Stock!



FOR LOCOMOTIVES,
PASSENGER
AND FREIGHT CARS

If your railroad pins and bushings are among Ex-Cell-O's wide range of standard sizes, you can save money and expedite delivery by ordering directly from stock. You'll get highest quality materials and workmanship, as evidenced by the fact that more than 200 railroads and equipment builders depend on Ex-Cell-O for hardened and ground steel pins and bushings. Order them directly from the convenient Ex-Cell-O Catalog.

For a complete listing of standard Ex-Cell-O Pins and Bushings for Diesel and steam locomotives and passenger car equipment, write for new Ex-Cell-O Bulletin 32428.



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EX-CELL-O CORPORATION
DETROIT 32, MICHIGAN

Check Electrical Insulation on Diesel Locomotives with...

"MEGOHMER" INSULATION TESTERS



"MINOR" Dwarf Size

Bakelite Case, 3 lbs. Variable pressure, DC Generator, 500 volts. Range 0-10, or 0-20, or 0-50 megohms.

Bulletin 450



"MAJOR" Small Size

4½ lbs. Constant pressure, DC Generator, 500 volts. Range 0-50 megohms with extra ohm scale.

Bulletin 465



"STANDARD"

Heavy duty type. Constant pressure DC Generator, 500 volts or 1000 volts. Ranges 200, 1000 and 2000 megohms.

Bulletin 455

HERMAN H. STICHT CO., INC.

27 PARK PLACE,
NEW YORK 7, N. Y.

Sweeney

POWERENCH

TOOLS

for diesel engine
maintenance

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...direct magnified reading
frees machinist's
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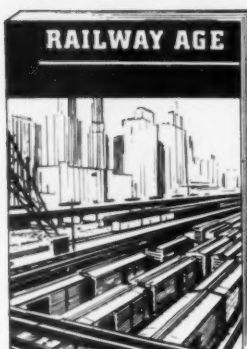
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Authoritative Weekly

Your magazine of management, news and interpretation — covering the whole field of railroading.



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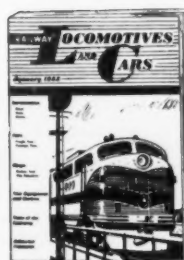


RAILWAY AGE

Railway Age is the weekly business paper of the railway industry . . . the recognized authority on railway matters. Through it, railway executives, operating officers, departmental officers and their staffs keep abreast of current events in the whole field of railroading.

Edited from the business point of view, it reports the news of the industry . . . interprets events and developments . . . alerts its readers to significant trends. It covers news from Washington, D. C. through its Washington staff . . . champions new developments in equipment and facilities. *Railway Age* is the publication that receives top priority reading from key men and those rising to important positions who must keep on top of events as they occur.

Paid subscriptions to *Railway Age* on the railroads today stand at the highest level in its history . . . emphasizing the importance railway men place on reading this business magazine.



Est. 1832

RAILWAY LOCOMOTIVES AND CARS

Published monthly, *R.L.&C.* is the specialized publication of railway mechanical and electrical officers and supervisors. Technical and practical in its editorial viewpoint, *R.L.&C.* keeps the reader abreast of developments, new practices and products that have to do with the design, construction, efficient operation and repair of locomotives, freight and passenger cars and the equipment and operation of shops. Its series "Diesel Electrics—how to keep them rolling," its freight and passenger car articles and shop articles are typical features.

RAILWAY SUPPLY INDUSTRY YEARBOOK



1954 Edition in Preparation

Comprehensive roster, catalog and directory of the whole railway supply industry, including key personnel, products, services and trade names. Copies available in every important railway office for use of those who select, specify and purchase railway products for every branch of railroading. Four main sections include "Who's Who" in the railway supply industry; Suppliers' Catalog Section; Directory of Products; Trade Names of the railway supply industry.

CAR BUILDERS' CYCLOPEDIA

New 19th edition, the standard reference work on all types of freight and passenger cars—their design, construction, parts, maintenance and repair. In 19 main sections, 1,200 pages and 3,000 illustrations, new edition provides descriptive text, photographs, diagrams and product catalog data covering the whole railway car field. Has dictionary of terms. Single copies \$12.00.

9 Simmons - Boardman Railway Publications

Railway Age (Weekly); *Railway Freight Traffic* (Monthly); *Railway Locomotives and Cars* (Monthly); *Railway Track and Structures* (Monthly); *Railway Signaling and Communications* (Monthly); *Ry. Supply Industry Yearbook* (1954); *Car Builders Cycloped* a (1953); *Locomotive Cycloped*ia; *Ry. Track & Structures Cycloped*ia.

BOOKS ON TRANSPORTATION AND BUILDING

Simmons-Boardman publishes a large list of books on transportation and building subjects.

Simmons-Boardman publications

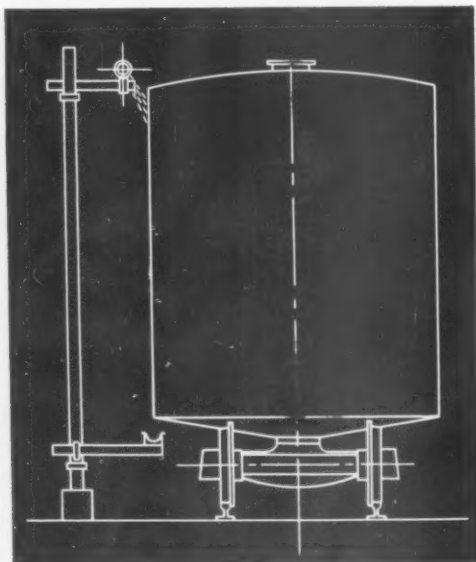
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Los Angeles

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Dallas • Portland, Ore.

• Terminal Tower, Cleveland 13, Ohio
• Washington, D. C.

BARGAIN

Effective Paint Stripper...5¢ a Gallon



Even greater savings are possible when you apply Cleaner 23 by the Stripping Rack Method. An efficient, low-cost rack which recirculates the solution can be made from readily-available shop materials.

WRITE FOR FREE BLUEPRINT

PENNSALT CLEANER 23 holds its own against any alkali paint stripper on the market, yet its price is the lowest in the field. Years of use have proved that it provides fast, effective stripping of the paints and lacquers commonly used on steel rolling stock and diesel locomotives.

This heavy-duty stripper is manufactured in easy-to-handle flake form—anhydrous and 100% active. It can be applied by the Spot Application Method, using a steam-gun spray unit; by the Soak-Tank Method, for combined cleaning and stripping; or—for maximum economy and speed—by the Stripping Rack Method (described at left).

If you've got lower stripping costs in mind, Cleaner 23 is for you. Make it the approved paint stripper on your road, too! Get a demonstration from your local Pennsalt Representative, or write for complete information. Railroad Maintenance, Pennsylvania Salt Manufacturing Co., EAST: 817 Widener Bldg., Philadelphia 7, Pa. WEST: 2168 Shattuck Ave., Berkeley 4, Calif.



**Pennsalt
Chemicals**

**PENNSYLVANIA SALT
MANUFACTURING CO.**

The Things We're Constantly Looking for Only Your Cost Accountants Really SEE!



WIX Engineering Sees the Problem of Clean Diesel Oil as a Prime Operation Cost!



Selection of "Prescription" Filtrants: Cotton Threads, Blended Cotton Threads, Felted Paper.

Uniform volume, density packed in one-piece Sock. Integral End-Seal or Grip-Seal Cartridge construction.

Spring-reinforced center tube, slotted for greater, more even flow rates.

Tin-plated metal parts. Bale-type handles for easy installation and servicing.

Reducing your "down-time" and major overhauls, as well as extending lube oil life for Diesels, are the prime targets of WIX Engineered Filtration for railroads. It is in the laboratory where WIX filtration study and research find the improvements and begin to lower costs that ultimately pay off in more economical operation for you.

WIX provides actual "prescription" filtrants for individual engine characteristics and variables in service and climatic conditions. All have been field tested, as well as laboratory tested, and are in wide use by many leading railroads on yard engines, freight and main line locomotives. All are efficient in the removal of micron-sized contaminants, possess inherent resistance to the development of acids, and none disturb the

vital additives in modern Diesel lubricants. All filtrants are processed and machined by WIX under precise quality standards from raw material to finished media.

Additionally, these "prescription" filtrants are density packed under electronic control in one piece, precision knitted "sock" Cartridges with many construction features developed by WIX for railroad applications. They guarantee you the utmost in Diesel filtration efficiency, longer life and simplicity of service.

Let WIX work on *your* problems of really CLEAN Diesel oil and fuel... the positive results will come in extended oil life, reduced engine "down-time" and show up in economies in your operations cost accounting.

ENGINEERED *wix* FILTRATION

WIX CORPORATION • • • • • GASTONIA • N.C.

WAREHOUSES

GASTONIA
ATLANTA

NEW YORK
DES MOINES

SACRAMENTO
ST. LOUIS

Personal Mention

(Continued from page 14)

New York Central

CARROLL STEVENSON appointed general foreman in the car department at Beech Grove, Ind.

New York, New Haven & Hartford

BERT R. JONES, assistant general mechanical superintendent at New Haven, has retired.

WILSON E. SYMONS, superintendent car maintenance, appointed assistant general mechanical superintendent at New Haven.

RUSSELL H. DAVIS, shop superintendent at Van Nest, N. Y., appointed superintendent car maintenance at New Haven.

ARTHUR E. MAYO, assistant superintendent at Van Nest, N. Y., shops, appointed shop superintendent.

New York, Susquehanna & Western

OTTO C. GRUENBERG, superintendent motive power at Little Ferry Station,

Ridgefield Park, N. J., appointed general manager in charge of operations and maintenance of equipment, with headquarters at Paterson, N. J.

Born: Gary, Ind., August 1, 1897.

Education: Tri State College (B.S.M.E. 1921); Harvard Business School, Railroad Administration (1930).

Career: Entered railroad service April 1922. Was a special apprentice engine-



O. C. Gruenberg



Paint more cars per day with A. F. I. Brand Finishes

Emporia Shop of the Santa Fe provides a fine example of modern paint shop methods.

A group of A.F.I. quick-drying freight car paints are used in the Emporia operation as well as in the shops of other railway lines.

The advantages of A.F.I. products for railway freight car painting are:

1. Higher output of cars per day
2. Proper film thickness.
3. Quick drying.
4. Higher gloss, cleaner cars.
5. Excellent durability.
6. Cleaner paint shop.

Numerous A.F.I. paint products for diesel locomotives, refrigerator and passenger cars are used by many other leading railroads throughout the country.

AUTOMOTIVE FINISHES, Inc.

Manufacturer of Automotive, Railroad and Industrial Finishes

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Dearborn, Mich.

P.O. Box 457, N.W. Station
Detroit 4, Mich.

house foreman, and dynamometer car engineer on the Chicago, Milwaukee, St. Paul & Pacific; general foreman and research engineer on the Boston & Maine; motive-power engineer for the American Locomotive Company, and superintendent motive power on the New York, Ontario & Western. Appointed superintendent motive power of the NYS&W in October 1945. Licensed professional engineer (N.J.).

GEORGE ENGLE, general foreman at Little Ferry Station, Ridgefield Park, N. J., appointed master mechanic, with headquarters at Little Ferry.

Seaboard Air Line

FRED WOODS appointed supervising electrician at Hamlet, N. C.

Southern

GEORGE A. FLOYD appointed foreman enginehouse, night, at Columbia, S. C.

JAMES N. HARLING appointed foreman enginehouse, day, at Columbia, S. C.

Obituary

WILLIAM F. KIESEL, JR., retired mechanical engineer of the Pennsylvania, died at Bethlehem, Pa., on May 24. Mr. Kiesel was in his eighty-eighth year. He retired on September 30, 1936, after more than 48 years' service on the Pennsylvania as draftsman, chief draftsman, assistant engineer, assistant mechanical engineer, and mechanical engineer. This period saw the introduction of carbon steel as the material of construction for both freight and passenger cars. It was also during this period that the locomotive test plant of the Pennsylvania at Altoona was providing a wealth of data on the basic proportions of the



WITH CAM-TYPE PIPE HOLDER

- ★ Improved cam-type quick-action pipe holder has broader jaws for more positive grip on pipe.
- ★ Free action cam assures instant setting to any size—1" to 2".
- ★ Easy to center . . . you get perfect aligned threads.
- ★ Fewer moving parts . . . minimum wear . . . light in weight. Amazingly compact . . . will thread a pipe projecting through a wall as short as 6 1/4".
- ★ Accuracy proven through the years . . . dies recede along tapered steps. A fine quality tool—yet low in cost! Write for new catalog. Order through your supply house. The Toledo Pipe Threading Machine Co., Toledo, Ohio. New York Office: 165 Broadway, Room 1310.

RELY ON THE LEADER . . . all the way!

TOLEDO
PIPE TOOLS.. POWER PIPE MACHINES
POWER DRIVES



America's Railroads Agree: DY-NAMIC BALANCING IS NECESSARY TODAY!

AIR CONDITIONING operates with less vibration!

WHEELS run smoother!

ARMATURES last longer!

BEARINGS wear slower!



At R & O Mt. Clare Shops, Baltimore, Md., every traction motor and generator armature is Dy-Namically Balanced before reassembly to reduce vibration and extend motor life.

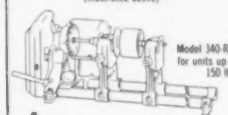
Special "Bear" Models for Railroad Balancing Requirements make it Easier, More Economical to get the Benefits of Dy-Namic Balancing

Today, there is sufficient performance data accumulated by railroads to make it evident that Dy-Namic Balancing is an important factor in cutting railroad maintenance costs. Dozens of leading railroads, such as those listed above have found that the adoption of Dy-Namic Balancing as a standard maintenance operation has been more than warranted by savings in lower costs, repairs, labor and reduced lay-up time. "Bear" Models, specifically designed for railroad work bring you ALL THE BENEFITS of DY-NAMIC BALANCING because:

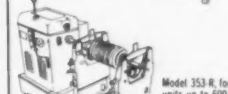
- they make it possible to balance armatures with minimum time and effort.
- they enable operator to change from one shaft size to another in minutes.
- they are highly accurate and dependable in all measurements.
- they prevent the "weaving action" often caused by static balancing alone because they do both static and dynamic balancing simultaneously.
- they are easy to operate . . . do not require skilled technicians.

- The Pullman Company
- Chicago, Rock Island & Pacific R.R. Co.
- Illinois Central System
- Chicago & Eastern Illinois R.R.
- Missouri-Kansas-Texas R.R. Co.
- Chicago, Burlington & Quincy R.R.
- Norfolk & Western R.R.
- Reading Company
- Baltimore & Ohio R.R.
- Chicago, Milwaukee, St. Paul & Pacific
- New York Central Railroad
- Fort Worth & Denver R.R.

Model 400-R for units up to 8 tons (illustrated above)



Model 340-R for units up to 150 lbs.



Model 353-R for units up to 600 lbs.



Model 375-R for units up to 3500 lbs.



FREE BULLETINS

Get full details by sending for your FREE copies of these "Bear" Bulletins on RAILROAD DY-NAMIC BALANCING.

Write Bear Mfg. Co., Dept. R-2, Rock Island, Ill.

"**BEAR**"
STATIC AND DY-NAMIC BALANCING MACHINES

steam locomotive. Mr. Kiesel's early steel freight-car designs considered unnecessarily strong and heavy at the time, proved to be sound economically and widely influenced the trend of steel freight-car design. Mr. Kiesel also made important contributions to the development of steel passenger cars. The Pennsylvania P-70 coach was a well-balanced design, without excess weight, which retained its position on that railroad until stronger corrosion-resistant steels and aluminum alloys replaced carbon steel as the materials of passenger-car construction.

Mr. Kiesel's leadership in the steam-locomotive development was built on the

results of the extensive work done at the Altoona test plant.

The E6s 4-4-2 type, K4S 4-6-2 type, and L1S 2-8-2 type locomotives, all of which were designed for low weight of reciprocating parts and very light valve-gear mechanism, were brought out by him in 1913-1915 and for many years were the major passenger and freight motive power of the railroad. Indeed, some of the K4's are still in use where their capacity is adequate for the service.

Mr. Kiesel's career was remarkable in that it included one revolution in car construction and because his influence was felt throughout the era of carbon steel as

the principal material of construction both for freight and passenger cars. It spanned the golden era of steam-locomotive development and extended into the era of electric traction on his own railroad, a field in which his influence was also felt.

SUPPLY TRADE NOTES

KOPPERS COMPANY.—Koppers has purchased substantially all stock of *American Lumber & Treating Co.*, thereby acquiring 10 wood treating plants located in various parts of the country.

AMERICAN LOCOMOTIVE COMPANY.—*Beaumont Iron Works Company*, Beaumont, Tex., has been formally merged into its parent corporation, American Locomotive Company. It is now an Alco plant, with the parent company taking over trademarks and other legal rights which had belonged to the wholly owned subsidiary.

Atomic Energy Projects Department.—Because of the growing importance of its atomic energy equipment business, Alco has established a new atomic energy projects department, to be supervised by *Kenneth Kasschau*, who has been appointed manager of engineering.

Mr. Kasschau, who was previously director of the research and medicine division of the Atomic Energy Commission's Oak Ridge operation, will be located at Schenectady and will report to Martin Ettington, general manager of engineering. Mr. Ettington has stated that the new department will be expanded as required for new projects and will be responsible primarily for developing and promoting principles of practical equipment design for atomic energy applications.

STANDARD RAILWAY EQUIPMENT MANUFACTURING COMPANY.—*A. A. Helwig*, vice-chairman at Chicago, has been elected chairman, to succeed *Arthur A. Frank*, retired.

Mr. Helwig entered the railway field as apprentice mechanic with the Minneapolis & St. Louis, and became general foreman of the Alton (GM&O) in 1915. Joining Standard Railway as vice-president in 1937, he was elected president in 1945 and vice-chairman in 1948.

MONTREAL LOCOMOTIVE WORKS.—*William G. Miller*, executive vice-president, has been appointed president, and *Stephen G. Harwood*, sales manager, has been named vice-president.

AMERICAN BRAKE SHOE COMPANY, BRAKE SHOE & CASTINGS DIVISION. *Rosser L. Wilson*, chief engineer has been appointed vice-president, engineering, succeeding *Robert B. Pogue*, who has reached retirement age, but will continue as consulting engineer. *John F. Ducey*, vice-presi-

"Cold" metal build-up helps beat skyrocketing replacement costs on 28 major railroads

Mettlizing helps railway men save time and money in mechanical maintenance. New material simplifies surface preparation—improves bond. One road reports yearly savings of \$100,000 to \$200,000.

Though metallizing has long been used by U. S. railroads, there has been a tremendous increase in its usage as a standardized maintenance process in the last few years. Users tell us there are two reasons behind this growth—sharp increases in replacement parts costs and requirements, plus the development of a new metallizing material that has enormously simplified and speeded the previously complex process of surface preparation, as well as providing a superior, reliable bond for the metallized build-up.

typical railroad applications

DIESEL LOCOMOTIVES

Engine crankshafts, mains, throws, fits;
Engine cylinders, cylinder liners, liner flutes;
Water jackets, camshaft bearings; shafts from associated equipment.
Generator, traction motor, and other armature shaft bearing fits.
Air compressor crankshafts.
Traction motor end housings.
Housings at pinion and commutator ends.
Axles at bearing fits and wheel seats.
Piston rods on pumps supplying steam generators.
Eroded or corroded portions of engine blocks.

STEAM LOCOMOTIVES

Hot water pump piston rods.
Slide and main rods.
Driving, engine truck and tender truck axles.

Wheel seat fits.

Fits on roller bearing axles.

CARS

Wheel seats on axles of equipment not used in interchange service.
Car lighting generator armature shafts and pulleys.
Dents and scratches in bodies of passenger and baggage cars.

bulletin available

We have prepared a four-page bulletin which illustrates and describes a number of these time-saving, money-saving metallizing applications, plus a chart that shows specific dollar-and-cents savings achieved in one typical shop. This data has been supplied to us by railroads using metallizing; the photographs were taken in user shops. This bulletin is free and may be obtained by writing us or with the handy coupon below.



free bulletin—

illustrates and describes standardized metallizing procedures in use by 28 major railroads. Chart shows specific savings made in one typical railway maintenance shop. Write for copy or use the coupon.

Don M. Watson
Metallizing Engineering Co., Inc.
38-14 30th Street, Long Island City 1, N. Y.

- ☐ Please send me free bulletin.
☐ Please have field engineer call.

Name _____

Address _____

City _____ Zone _____ State _____

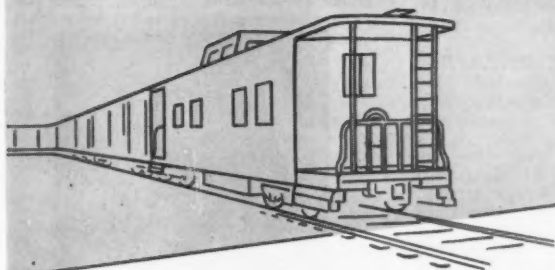
**METALLIZING
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38-14 30th St. Long Island City 1, N. Y.



In Great Britain: Metallizing Equipment Company, Ltd. Chesham near Woking, England

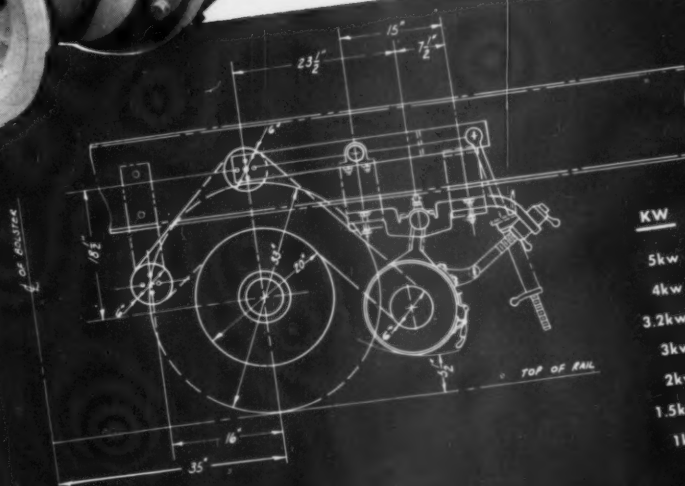
NOW...STANDARD *"Safety"* GENERATING EQUIPMENT for CABOOSE POWER



- To meet the growing demand for increased charging capacity for larger batteries plus increasing communication load requirements, progressive railroads are standardizing on generators with power in excess of their present positive needs.

- "SAFETY" Generators, now in service on all railroads, are available in a wide range of capacities. This equipment offers the maximum in proven performance ... interchangeability of parts ... low maintenance.

- The application shown below includes the patented "SAFETY" endless flat belt drive with sprung idler. Generator position and idler tension are both readily adjustable. Endless V-belt drive is also available.



KW	VOLTAGE	TYPE
5kw	32	DA-5475
4kw	32	C-4550
3.2kw	32	GF-32250
3kw	32	C-3450
2kw	32	C-2400
1.5kw	32	B-15425
1kw	15	AA-1500

THE SAFETY CAR HEATING AND LIGHTING COMPANY INC.

NEW YORK • CHICAGO • PHILADELPHIA • ST. LOUIS • SAN FRANCISCO • NEW HAVEN • MONTREAL

SAFETY COMPANY PRODUCTS INCLUDE: Air-conditioning Equipment • Genmotors • Generators • Fans • Regulators • Blower Units • Lighting Fixtures • Switchboards • Luggage Racks • Motor Alternators • Dynamotors • Motor Generators • Dual Voltage MG Sets

Manufacturers' Literature

Following is a compilation of free literature, pamphlets and data sheets offered by manufacturers to the railroad industry. Circle the number(s) on the coupon below to receive the information desired; the requests will be sent direct by the manufacturers.

1. GIANT CAP SCREWS. *Standard Pressed Steel Company.* 4-page illustrated folder "Oversize Cap Screws" describes and lists consumer net prices for the new line of giant Unbrako cap screws of heat-treated alloy steel, diameters from 1½" to 3", and up to 12" in length.

2. HYDRAULIC POWER UNIT. *Ex-Cell-O Corporation.* Illustrated folder (Bulletin 45040) "Ex-Cell-O Quill Type Hydraulic Power Units" describes, illustrates, and gives specifications for styles 22 and 22-L; for details on other standard units specify Bulletin 45828.

3. FLAT CAR FOR TRAILERS. *Pullman-Standard Car Manufacturing Company.* 24-page 2-color "The P S Flat Car For Trailers Plus General Purpose Use" shows pictorially with scale model photographs and drawings features of flat cars for trailers, as well as how end loading and side loading methods are accomplished; lists and diagrams the combinations of trailer sizes accommodated.

4. PNEUMATIC EQUIPMENT. *Gardner-Denver Company.* Bulletin #GP-100 covers the line of G-D pumps, compressors, rock drills and pneumatic equipment, contains condensed basic information and specifications for each product or group in individual bulletins, and is plastic bound with eleven product sections index-divided.

5. STEEL CONDUIT FOR ELECTRICAL SECTIONS. *Rome Cable Corporation.* 8-page 3-hole punched Bulletin C-1 "The Story of Rome Rigid" gives historical background and specific details with applications of Rigid steel conduit for electric system protection.

6. RAILROAD CLEANERS AND PROCEDURES. *Wyandotte Chemicals Corporation.* 50-page reference book "Wyandotte Railroad Cleaners and Cleaning Procedures" gives detailed use-directions, physical and chemical properties, of the Wyandotte railroad cleaner line.

7. HOSE COUPLING. *Titeflex, Inc.* 16-page booklet "Titeflex Quick-Seal Coupling" describes the quick connect-disconnect hose coupling for water, oil, steam, gas and chemical lines; also describes single and double check valve modifications, and coupling accessories; includes table of pressures, tables of materials and sizes, and a list of users.

8. GRINDERS. *Landis Tool Company.* 28-page 2-color general catalog (CG-54) "Precision Cylindrical Grinders" illustrates, briefly describes and gives specifications for universal, plain, roll, centerless and special purpose grinders for cranks, cams, pistons, valves and similar parts.

9. BALANCING MACHINES. *Bear Manufacturing Company.* Brochure (IB-3004) gives complete details and specifications of Bear "Dy-Namic" balancing machines models 353-R and 354-R.

10. POWER-LIFT UNITS. *Lewis-Shepard Products Inc.* 4-page circular (28A) describes the battery powered and hand winch types of Lewis-Shepard electro-hydraulic platform and straddle stackers, "the handy hoister."

11. RAILWAY INSULATION. *Johns-Manville.* 4-page illustrated folder (RR-15A) gives complete details and photographs show typical installations of Johns-Manville Stonefelt used to control insect infestation and help reduce interior corrosion behind box car linings.

12. WIRE ROPE. *John A. Roebling's Sons Corp.* 60-page "Wire Rope Recommendations and Catalog" illustrates, describes, and gives specifications for simplified ordering and reference for wire rope users; divided into 16 industry sections, index tabbed for quick reference and code numbered.

13. CORROSION CONTROL. *Subox, Inc.* 20-page booklet "Corrosion Control of Electric Light and Power Structures and Equipment" describes and pictures many different uses and applications of Subox and Subalox paints.

14. HOT BOXES. *Wauagh Equipment Company.* 24-page 2-color laminated finish booklet "What Causes & How To Prevent Hot Boxes" shows in a novelly produced manner what causes hot boxes and then goes on to show how Plypak journal box waste container and retainer reduces the incidence of hot boxes.

15. RAILWAY APPLIANCES. *Morton Manufacturing Co.* 42-page catalog "Morton Railway Appliances" contains complete details, specifications and pictures typical applications by means of numerous data sheets on freight car running boards and brakes steps, locomotive foot boards, passenger car products.

dent of the division, has been transferred from San Francisco to New York headquarters. *William N. Hulme*, sales representative, has been named district sales manager of brake shoes, and *John L. Goheen*, district manager for commercial research on the West Coast, has been appointed district sales manager of castings. Messrs. Hulme and Goheen will be located at San Francisco.

Mr. Wilson, who was formerly chief engineer of the BS&C Division, joined the



R. L. Wilson

company in 1935 as an engineer. He became assistant chief engineer in 1937 and chief engineer in 1949.

Mr. Pogue joined Brake Shoe as an apprentice inspector in 1916. He served in various inspecting and engineering capacities and became chief engineer in 1937. He was appointed vice-president of engineering for the BS&C Division in 1949, from which position he is now retired.

ALUMINUM COMPANY OF AMERICA.—*William C. Woodward* has been appointed manager of forging sales, with headquarters at Cleveland. Mr. Woodward, who was assistant manager of forging sales, succeeds *M. W. Hodgdon*, who died on April 22.

GENERAL STEEL CASTINGS CORPORATION.—*Howard F. Park, Jr.*, has been elected vice-president, sales, and *J. Harvey Johnston*, vice-president.

AIR REDUCTION SALES COMPANY.—*H. R. Salisbury*, president, has retired. *J. H. Humberstone*, president of the Ohio Chemical & Surgical Equipment division of Airco in Madison, Wis., succeeds Mr. Salisbury. Mr. Humberstone is also vice-president of Air Reduction Company, Inc.

BALDWIN-LIMA-HAMILTON CORPORATION.—Baldwin-Lima-Hamilton Corporation has arranged to reacquire from Westinghouse Electric Corporation 515,000 shares of B-L-H common stock which represented the largest single block, approximately 10%, of all B-L-H common stock.

The transaction was agreed to by both companies after Westinghouse decided to withdraw from manufacture of heavy electrical equipment for railroads. Westing-

Reader Service Department
Railway Locomotives and Cars
30 Church Street, New York 7, N. Y.

JULY, 1954

Please send literature circled below:

1	2	3	4	5	6	7	8
9	10	11	12	13	14	15	

Also, please send me additional product information as follows: (company, product & page number)

Name Title or Position

Company

Address

City

Zone State

house will continue to make street car, trolley coach and rapid transit equipment, and commuter-train equipment for railroads, but will discontinue manufacture of electric and mine locomotives and equipment for diesel-electric locomotives. Renewal parts for discontinued items will still be built by Westinghouse. Future needs of B-L-H for heavy electrical equipment for transportation will be supplied by the General Electric Company.



F. LaQue

INTERNATIONAL NICKEL COMPANY.—*Frank L. LaQue* has been elected vice-president and manager of the Development and Research Division. Mr. LaQue succeeds *Thomas H. Wickenden*, who has attained retirement age but will continue to serve as a consultant on special projects. *O. B. J. Fraser* and *Donald J. Reese* are assistant managers of the division.

Mr. LaQue became associated with the Development and Research Division after receiving his degree of Bachelor of Science in Chemical and Metallurgical Engineering from Queen's University, Kingston, Ont., in 1927. His activities were then devoted to the field of corrosion and corrosion-resisting materials. In 1937 he was appointed assistant director of technical service on mill products, and in 1940 became engaged in development activities on all applications both of ferrous and non-ferrous nickel-containing alloys. The corrosion testing stations of the company at Kure Beach and Harbor Island, N. C., were established under his leadership. Mr. LaQue was the recipient of the F. N. Speller Award in Corrosion Engineering of the National Association of Corrosion Engineers, of which he is a past president. He is chairman of the Advisory Committee on Corrosion of the American Society for Testing Materials and is also a member of the Corrosion Advisory Committee, Prevention of Deterioration Center, National Research Council.

WILSON ENGINEERING CORPORATION.—The *Woodruff Ball Joint Company* has been acquired by Wilson Engineering, who will produce Woodruff Syphon Jet Systems at its Bloomington, Ill., plant.

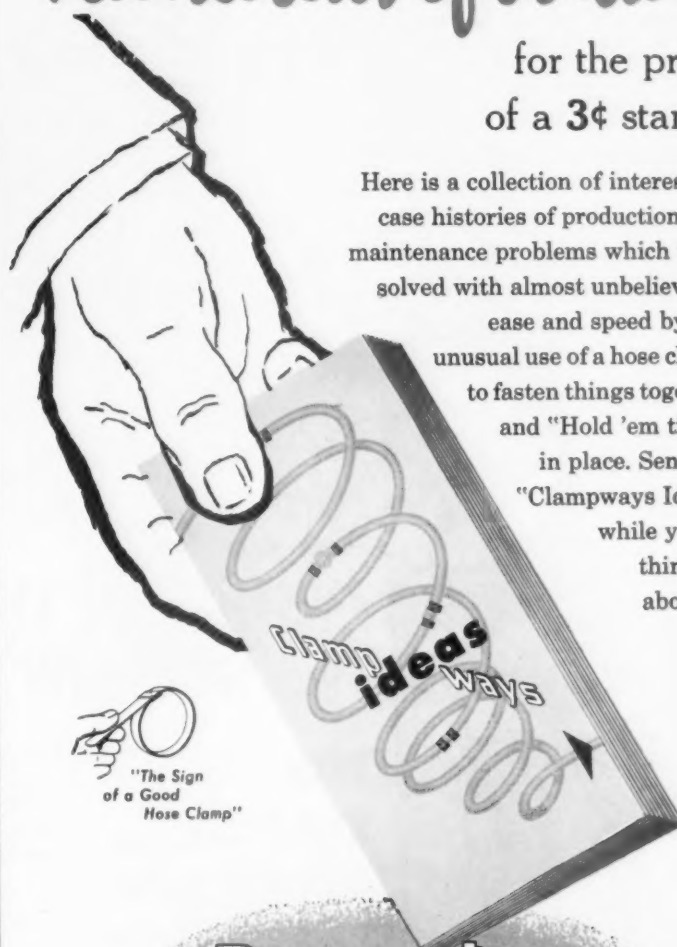
PRESSED STEEL CAR COMPANY.—Permanent closing of Pressed Steel's Mt. Vernon, Ill., freight-car building plant has been announced by John I. Snyder, Jr.,

ideas...worth

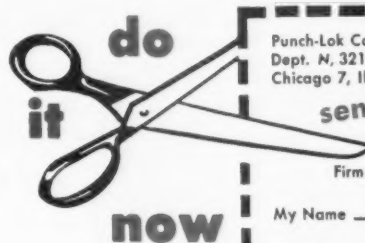
hundreds of dollars

for the price
of a 3¢ stamp

Here is a collection of interesting case histories of production and maintenance problems which were solved with almost unbelievable ease and speed by the unusual use of a hose clamp to fasten things together and "Hold 'em tight" in place. Send for "Clampways Ideas" while you're thinking about it.*



PUNCH-LOK
Company



Punch-Lok Company
Dept. N, 321 North Justine Street
Chicago 7, Illinois

send me **Clampways ideas**
FREE

Firm Name _____

My Name _____ Title _____

Address _____

City _____ State _____

4800

president and chairman. Details for disposition of the plant have not been worked out.

■
ACF INDUSTRIES.—The American Car & Foundry Co., originally incorporated in 1899, has changed its name to ACF Industries, Inc. The new name "was adopted as being more descriptive of the company's present business and future objectives."

■
T-Z RAILWAY EQUIPMENT COMPANY; MORRIS B. BREWSTER COMPANY.—*J. W. Seabough* has been elected vice-president of the T-Z and the Brewster Company at Springfield, Mo.

SPRING PACKING CORPORATION.—*Harry Lock* has been appointed assistant vice-president—sales and service at Los Angeles.

■
FAIRBANKS, MORSE & CO.—*R. H. Morse III* has been appointed assistant to the vice-president in charge of sales, with headquarters in Chicago. *W. E. Watson*, works manager of the Company's affiliate, the Canadian Locomotive Company, succeeds Mr. Morse as manager of the F-M works at Beloit, Wis. *E. C. Golladay*, manager, railroad department at Chicago, has retired and has been succeeded by *William G. Herzig*, field engineer.

UNION ASBESTOS & RUBBER CO.—*Edwin E. Hokin*, vice-president—heating and cooling division at Chicago, has been elected president and chief executive officer, to succeed *Norman C. Naylor*, who becomes chairman of the board. Named as



Edwin E. Hokin

field sales manager of the cooling division is *R. M. Anderson*. *Emil T. Johnson* has become vice-president in charge of production and engineering.



R. S. Morton

■
MORTON MANUFACTURING COMPANY.—*Robert S. Morton*, has been named vice-president at Chicago.



T. C. Gray

PULLMAN-STANDARD CAR MANUFACTURING COMPANY.—*T. C. Gray*, director of engineering has been elected



**mr.
nafco^{*}
says ...**

"Heads or tails you still WIN... because 'locked-in' values 'lock-out' trouble and make this the most economical of all Diesel Filter Cartridges!"

"REASON?"

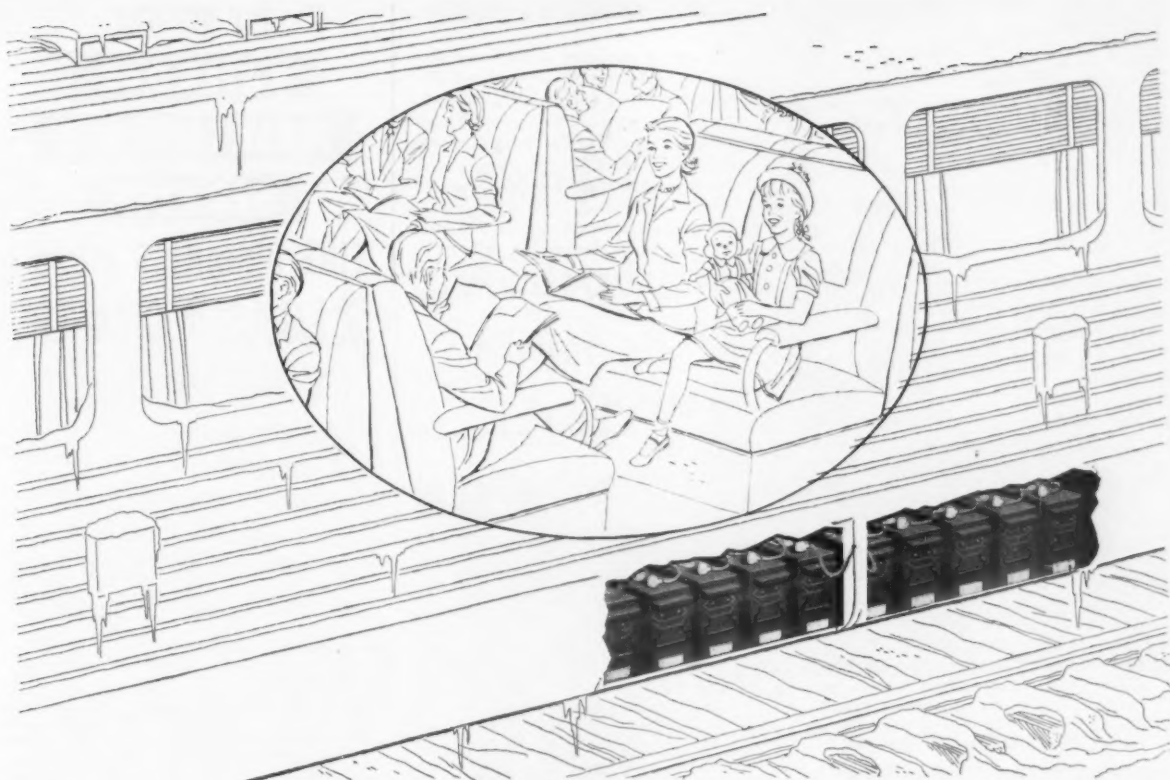
There's never any gamble with lower cost performance; longer service life; smaller initial cost and reduced end costs!"

*"I'm the trade-mark of the Nash-Finch Company—and registered too!"

"Send for my free cartridge reference chart!"

NASH FINCH CO.

1752 HENNEPIN AVE. • MINNEAPOLIS 3, MINN. • Lincoln 7611



Average Battery Life 23 Years

Average Winter Temperature 20° Below

Frigid Winter Temperatures averaging 20 below—frequently 40 below and sometimes 55 below—do not hamper the Ontario Northland Railway in providing modern passenger service through the land of the fur traders as far north as Moosonee on James Bay.

Dependable Battery Performance has materially contributed to the successful operation of this road's passenger equipment under such adverse conditions—aided only by insulated, snowtight battery compartments and positive generator drives.

23 Years is the average life of EDISON batteries used by this road; two sets are in their 37th year of service. Then too, EDISON batteries that

have completed normal service life are utilized for many extra years of service in baggage and combination cars.

Regardless of Conditions, EDISONS are the most dependable batteries you can install. Their extraordinary "long life" means lowest over-all cost. They can safely be kept in a high state of charge on the road, thus reducing the need for yard-charging. They successfully withstand the overcharging and overdischarging incidental to railway-car service. Complete facts on EDISON railroad batteries are available in Bulletin SB 3802. Write for your copy and the name of your nearest Edison field engineer today. Edison Storage Battery Division of Thomas A. Edison, Incorporated, West Orange, N. J.



Most Dependable Power —
Lowest Over-all Cost
... you get both with an EDISON



EDISON

Nickel · Iron · Alkaline
STORAGE BATTERIES

EDISON ALSO MAKES THE FAMOUS "V. P." VOICewriter AND THE TELEVOICE SYSTEM

W. 1063

IDEAL
SHORTCUTS
 to better
 commutator
 maintenance

QUALITY-BUILT
 TO DO THE JOB
 RIGHT! . . .



The easiest way to restore commutators in traction motors and generators without dismantling during interim maintenance...or during periodic overhauls. IDEAL Resurfacers and other tools are used by leading railroads and recommended by locomotive builders.

RESURFACERS



Refinish commutators to like new condition even when ridged, scored or burned. Wood block handles clamp rigidly into grinder. Seven sizes, in all grades from extra coarse to extra polish.

MICA UNDERCUTTERS



Work easily in close quarters. Several models. Direct drive or by flexible shaft.

For use with IDEAL Commutator Saws and Milling Cutters.

FLEXIBLE ABRASIVE

Cleans and burnishes commutators. Non-dusting. Complete size range.

CLEANER-BLOWERS

Blows air at high velocity and harmless low pressure. Lightweight and rugged. May also be used as a vacuum cleaner or sprayer. Three models: $\frac{3}{8}$, $\frac{1}{2}$ and 1 $\frac{1}{2}$ H.P.



FREE 39-page Handbook
 Complete information on
 commutator maintenance.
 Mail coupon.

IDEAL Products Are Sold through
 Leading Distributors



IDEAL INDUSTRIES, Inc.
 1563 Park Avenue, Sycamore, Illinois

Send FREE Handbook and catalog sheets on:

☐ Resurfacers ☐ Flexible Abrasive
☐ Undercutters ☐ Cleaner-Blowers

Name _____

Title _____

Company _____

Address _____

City _____ Zone _____ State _____

vice-president in charge of engineering, at Chicago.

Mr. Gray, a graduate of Purdue University with bachelor and professional M.E. degrees, has been, successively, connected with the Santa Fe, the Missouri-Kansas-Texas, the Barco Manufacturing Company, the Franklin Railway Supply Company, the Treadwell Engineering Company, and the American Engineering Company. He has a professional engineering license and holds several patents on locomotive, railway car and industrial devices. He is a member of the American Society of Mechanical Engineers.

NEW DEVICES

(Continued from page 116)



High Speed Press Brake

Operating at 70 strokes per min, and equipped with a specially arranged ram, this high-speed, all-steel press brake can be used for high speed punching and automatic feeding applications.

The device has an all steel rolled plate construction with an interlocked frame, push button control to the ram adjustment, micrometer indicators, centerline loading and automatic pressure lubrication. Additional features include a double hook tongue in the ram to withstand a 20 ton stripping load.

Cincinnati Shaper Company, Cincinnati 25.

Foaming Paint Remover

An aerosol paint remover formula for producing a foaming action that is claimed to be faster, cleaner and more active than brush-applied types has been developed and made available free of charge to interested packagers.

Laboratory experiments indicate that the "slushy" snow-like deposit obtained with the spray increases activity of the remover by holding the solvents in contact with the paint or varnish better than brushed-on compounds. It is equally effective with enamels and nitro-cellulose lacquers. However, its biggest advantage is with varnish,

for greater RAILROAD MAINTENANCE SERVICE

FINE ORGANICS offers
2 EMULSION CLEANERS
 that excel in

- ✓ SOLVENCY
- ✓ DETERGENCY
- ✓ DIRT PENETRATION
- ✓ EASE OF RINSING
- ✓ NON STREAKING
- ✓ NON STAINING

F.O.-106

Specifically designed
 for exterior car
 cleaning . . .

the degreasing and
 cleaning of mechanical
 parts, motive equipment,
 engines, engine pits,
 shop floors.



F.O.-116

Made to fulfill the need
 for a heavy duty cleaner
 and degreaser. Used
 for rugged jobs, under
 carriages and exteriors,
 running gear and surfaces
 — and areas subject to
 heavy oil, asphalt and
 other tenacious accumulations.

The superior solvency of these two
 emulsion cleaners . . . the effective
 dirt penetration and easy rinsabil-
 ity cuts cleaning costs and saves
 valuable personnel time.

also available **F.O.-162 and F.O.-102**
 Carbon Removers



F.O.-128 and F.O.-101
 'Safe-tee' Solvents

Write to Dept. '3'.
 for complete information

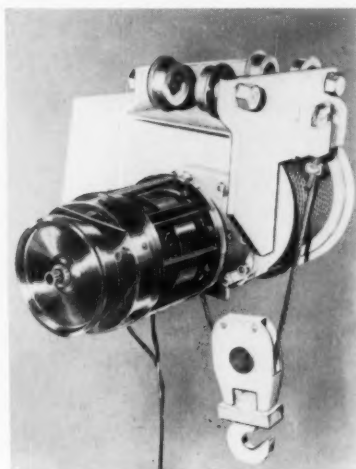
FINE ORGANICS, Inc.

211 East 19th St. • New York 3, N. Y.

usually more difficult to remove than other types of coatings.

Methylene chloride is an important ingredient in the formulas. Esters, ketones and alcohols have been added to increase effectiveness in cutting lacquers. Freon-12 dichlorodifluoromethane is recommended as the propellant in the formulations. Complete information is contained in a technical bulletin.

Kinetic Chemicals Division, E. I. duPont de Nemours & Company, Wilmington, Del.



Heavy Duty Hoists

These hoists for overhead materials handling will have capacities ranging upwards from 4 tons to over 15 tons. The line will feature a-c electric motors and gear reduction units.

Standard models of 4-, 5- and 6-ton capacities have a wire rope lift, with swivel hook suspended on a two-part line. The devices are of all steel construction with their electrical components protected for outdoor operation. Suspension is by lug, hook, plain or geared trolley.

Positive load control to a fraction of an inch is offered and is made possible through a bi-metallic friction brake synchronized with the push-button controls. Limit switches are available as optional equipment.

The hoist motors operate from a power source of 220- or 440-volt, three-phase a-c. These motors are of single speed, reversible squirrel cage induction type.

R. G. Le Tourneau, Inc., Longview, Tex.

Cleaning Solution Testing Kit

This industrial Teskit for railroad service makes it possible to check concentrations of cleaning solutions such as alkaline soap cleaners, water wash spray booth compounds, electrocleaners, phosphating cleaners, rust removers and metal etchants by a simple, non-technical procedure.

(Continued on page 92)

Strips Railroad Finishes Fast and Clean!



In car and diesel shops, Magnus Stripit saves both labor and time costs in the removal of varnishes, lacquers, synthetic enamels and paints from coaches, locomotives and other surfaces.

It has these advantages:

- Heavy-bodied—clings to vertical surfaces.
- Spreads uniformly and evenly.
- Removes several coats with one application.
- Rinses off with pressure stream of water.
- Requires no neutralizers after rinsing.
- Non-flammable.
- One gallon covers 100 square feet of surface.
- Does not raise the grain of wood.

A Magnus Representative will gladly demonstrate Magnus Stripit on your own equipment.



**Railroad Division
MAGNUS CHEMICAL CO., INC.**

166 South Ave., Garwood, N. J.

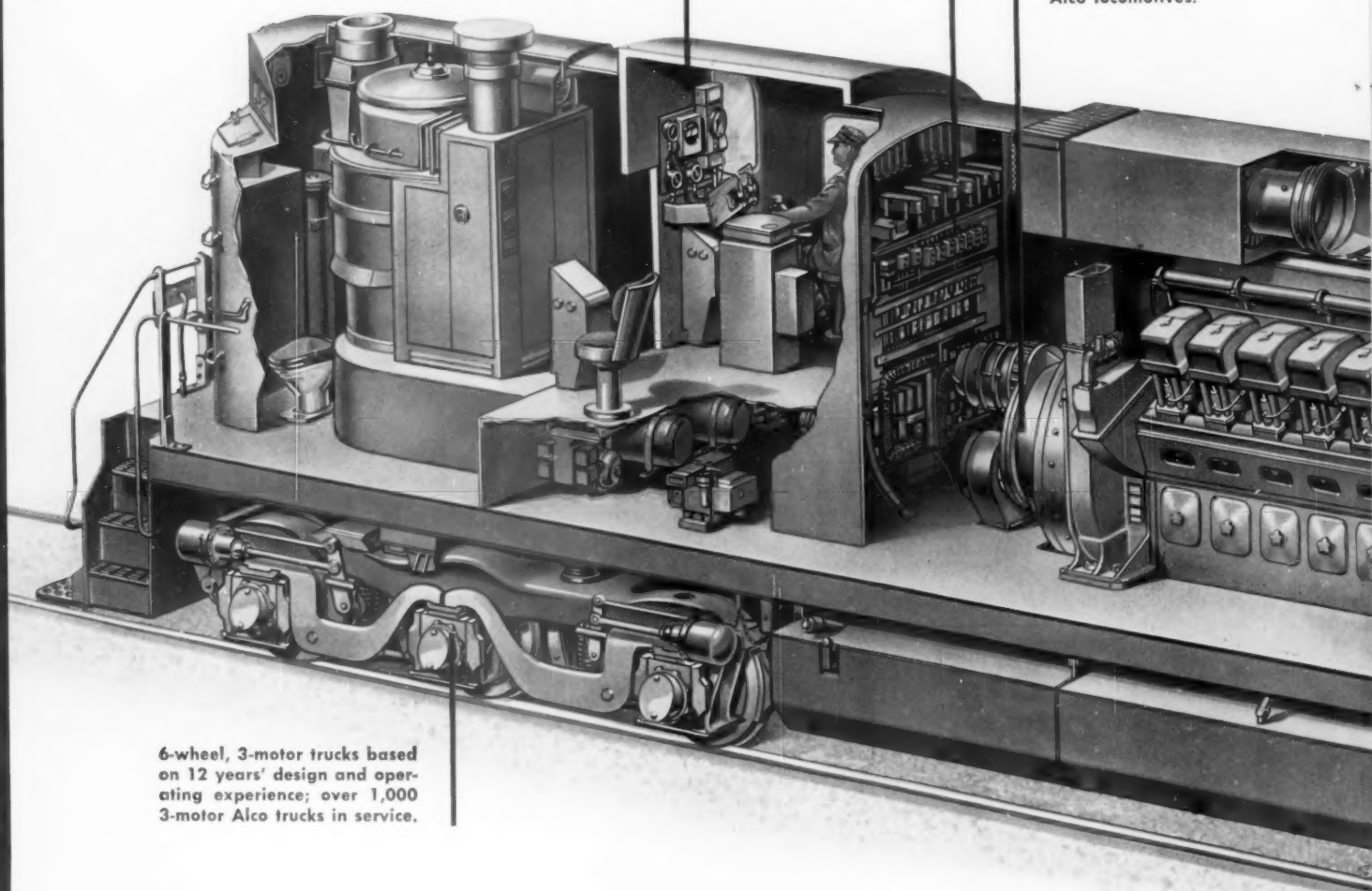
In Canada: Magnus Chemicals, Ltd., Montreal
Representatives in All Principal Cities

Features of Alco's New "2-for-3" Locomotive

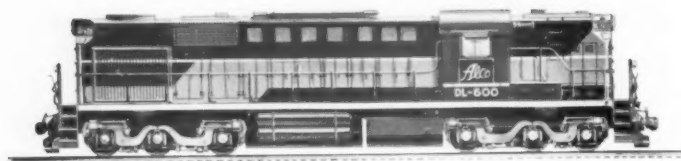
Roomy cab designed for comfort and safety of crew has excellent visibility and low noise level.

Control panel arranged for instant accessibility.

Traction generator with higher current capacity, but interchangeable with generators on other Alco locomotives.



6-wheel, 3-motor trucks based on 12 years' design and operating experience; over 1,000 3-motor Alco trucks in service.



Two DL-600's will normally do what three 4-motor units will do...with these advantages:

- substantially less original investment — two units to buy instead of three
- substantially less operating cost — two units to operate instead of three
- substantially less maintenance cost — two units to maintain instead of three
- *plus:* 15% shorter length . . . higher continuous tractive effort . . . 25% more dynamic braking effort . . . same number of tractive motors (12) in only 4 trucks
- with greater versatility

For complete details on this latest example of Alco's better motive power for greater earning power, contact your nearest Alco locomotive representative.

ALCO

AMERICAN

Provide More Power—Do More Work—At Lower Cost

Dynamic braking (heat dissipator unit) provides 3400 hp, maximum braking power . . . highest available anywhere.

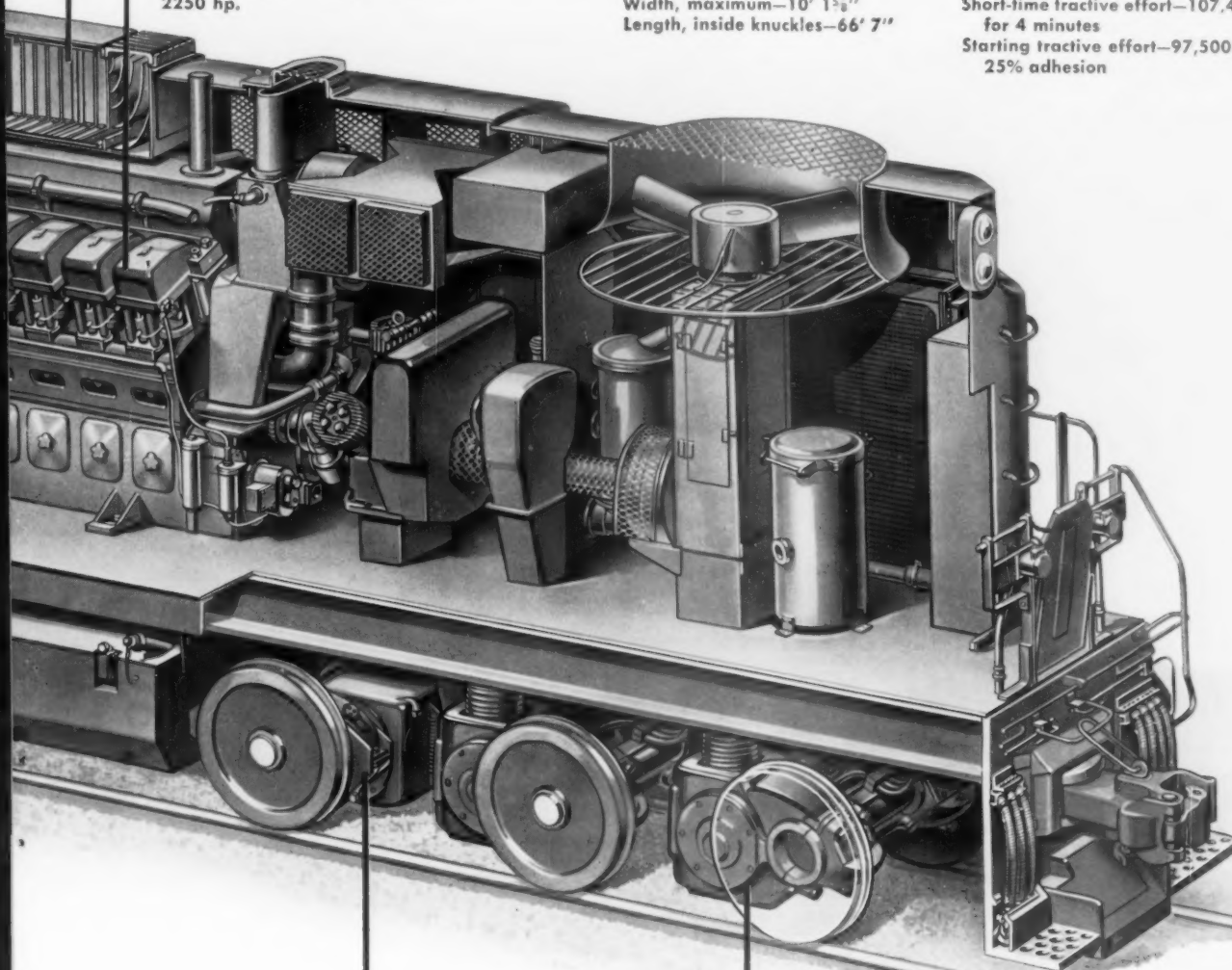
Improved Alco Model 244 16-cylinder V-type diesel engine with new water-cooled turbosupercharger—conservatively rated at 2250 hp.

Dimensions:

Maximum weight 390,000 lb
Minimum weight 325,000 lb
Height, maximum—14' 8 $\frac{3}{8}$ "
Width, maximum—10' 1 $\frac{5}{8}$ "
Length, inside knuckles—66' 7"

Continuous tractive effort:

65 mph gearing—79,500 lb
75 mph gearing—69,800 lb
80 mph gearing—65,200 lb
Short-time tractive effort—107,400 lb
for 4 minutes
Starting tractive effort—97,500 lb at
25% adhesion



Clasp brakes provide positive action.

Traction motors — the same rugged, high output motors installed on all Alco road locomotives—produce highest continuous and short-time tractive effort of any diesel electric unit.

LOCOMOTIVE COMPANY

Sales and
Service Offices
in Principal
Cities

GARLOCK REPLACEMENT PARTS

Gaskets—Packings—Molded Rubber Rings for diesel locomotives . . .



Section of Garlock's diesel parts stock room

NOW pre-stocked in handy boxes,
ready for immediate shipment



Packaging and labeling
diesel parts after
inspection.

Garlock diesel replacement parts—gaskets, packings and molded rubber rings—are boxed in convenient quantities for ease in handling, storing and redistribution to shop men, overhaul shops and terminal points.

All boxes are labeled for instant identification—no cross-reference parts list needed.

Garlock diesel gaskets, packings and molded rubber rings are giving completely satisfactory service on leading railroads. Specify Garlock diesel replacement parts and write us for complete parts-and-price list.

THE GARLOCK PACKING COMPANY, PALMYRA, NEW YORK
In Canada: The Garlock Packing Company of Canada Ltd., Toronto, Ont.
Branch Offices in Most Principal Cities

GARLOCK

PACKINGS, GASKETS, OIL SEALS,
MECHANICAL SEALS, RUBBER EXPANSION JOINTS



By varying the testing solutions, the testing outfit is adaptable to all railroad products in this line, except emulsion cleaners. The kit contains two bottles. One is equipped with a dropper while the other contains a pipette-type dropper and has a testing level-mark etched into the glass. Bottles are held in a sturdy, fiber box containing labels and testing instructions.

Technical Service Department, Wyandotte Chemicals Corporation, Wyandotte, Mich.



Outdoor Lighting Unit

A lighting unit for building exteriors and outdoor areas designated as No. 415 has been introduced by the Holophane.

The metal parts are die-cast aluminum with a lacquered finish. The use of these die-cast parts assures precision of size and detail. The enclosing glass is a double-thick prismatic refractor. It is composed of hundreds of glass prisms built to optical standards to direct the light downward and outward for wide coverage and to produce a uniformly lighted appearance free from dazzle and dark bands.

The hood is constructed to exclude dust and rust and to withstand all weather conditions. For relamping, the door screws are loosened, and the glass assembly swings open on a concealed hinge.

Holophane Company, 342 Madison avenue, New York.

Semi-Automatic Cleaning Machine

The XAC axle-cleaning machine is a semi-automatic unit for flame and brush cleaning of railroad car axles, designed to comply with A.A.R. recommended practice for flame-cleaning of axles.

The XAC unit is arranged for overhead loading, using a hoist or jib crane. Floor to floor time is estimated to be about 4 min. or 15 axles per hour. Operation is semi-automatic; with the carriage at the extreme left end of unit, an axle is placed

PENTA

DOW

PROTECTS CAR LUMBER AGAINST HIDDEN DECAY



This clean wood preservative controls rot and decay
—cuts your replacement costs 50% or more!

Railway authorities now recognize that mechanical wear is hastened by the early, unseen stages of decay. Preventing this decay with Penta* means fewer trips to the repair shop for lumber replacement.

You can order pressure-treated wood to your specifications—Penta also keeps it in good condition in your repair yard until it's used. For complete information about *Pentachlorophenol, the modern wood preservative, write to THE DOW CHEMICAL COMPANY, Midland, Michigan.

THE DOW CHEMICAL COMPANY
Dept. PE-753H-1 Midland, Michigan

Please send me:

- ☐ List of PENTA treating plants.
☐ Literature on car lumber treatment.

Name

Title

Company

Address

City State

you can depend on DOW CHEMICALS

DOW

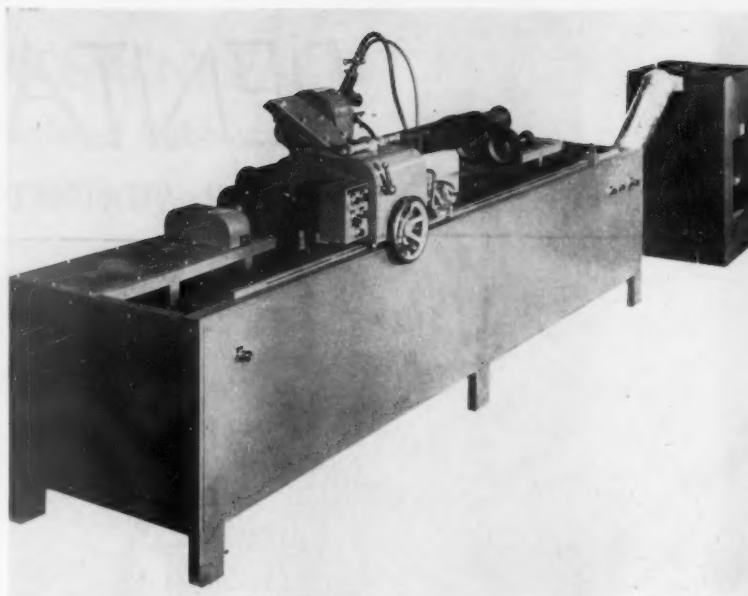
RAILROAD Maps, Tracings
are Safe, Findable here



Lifetime Map Cabinets used by:

Clinchfield, Missouri Pacific, General Motors, Douglas Aircraft — others here, abroad. Every map filed and found instantly through ingenious indexing. Disappearing door, when closed, locks out dust, moisture, pilferers. Increases life, protects drawings. Sections can be added as needed. Ask for Catalog 352-B.

Write **Ross-Martin Company**
BOX 800-B • TULSA 1, OKLA.



XAC axle-cleaning machine

on the steadyrest rollers, the motors started, the brush arm lowered and the clutch engaged. The carriage traverses to the right where an adjustable stop disengages the clutch. The brush arm is raised (the motor may be stopped), the carriage hand-crank returned to the left, and the axle

removed. Alternately, the entire cycle can be controlled by manual sequencing.

When flame cleaning is employed the cycle is the same as mentioned above, except that when the start button is pushed the torch will ignite (assuming the pilot is lit). The stop, which disengages the clutch, will also shut off the torch leaving the pilot lit. Safety devices incorporated require that the axle be rotating and the carriage traversing in order for the torch to remain ignited. The rate of traverse is 26 in. per min.

The rate of rotation is 600 surface in. per min. or 38 rpm for a 5-in. diameter axle. The cost of gas per axle, using pipe line supply acetylene and oxygen, is 8½ cents; using bottle supply, 14½ cents.

A dust collection nozzle is located at the wire brushes, connected through flexible tubing to an 8-in. diameter exhaust collar at the right end of the unit. This collar can be connected to any suitable dust collection system having a conveying velocity on the order of 5,600 lineal fpm, with 1,100 cfm (minimum) capacity.

Magnaflux Corporation, 5900 Northwest Highway, Chicago.

Special Railroad Mount

Strand
FLEXIBLE SHAFT GRINDERS

Designed
for RR
Shop Use



For grinding, sanding, rotary filing, wire brushing, drilling, deburring or polishing. With this new Railroad Mount, you take the Strandflex machine right to the work. You'll find it invaluable for a variety of different jobs in diesel shops, car shops. Promotes efficiency; workers lift only the tool—not the heavy motor.

Also Gasoline Powered Unit for Bridge or Maintenance of Way Depts.

All-purpose compact 5 hp. gasoline engine powered STRAND Flexible Shaft machine, governor controlled operating speeds from 2200 to 3200 rpm. Ideal for grinding rail welds, wire brushing before painting, smoothing concrete, etc. Makes you independent of electric power and air compressors.

Write for details on STRAND Flexible Shaft Machines
specially designed for railroad use.



FRANKLIN BALMAR CORPORATION

Woodberry, Baltimore 11, Maryland
Chicago Office: 5001 North Wolcott Avenue, Chicago 40, Ill.

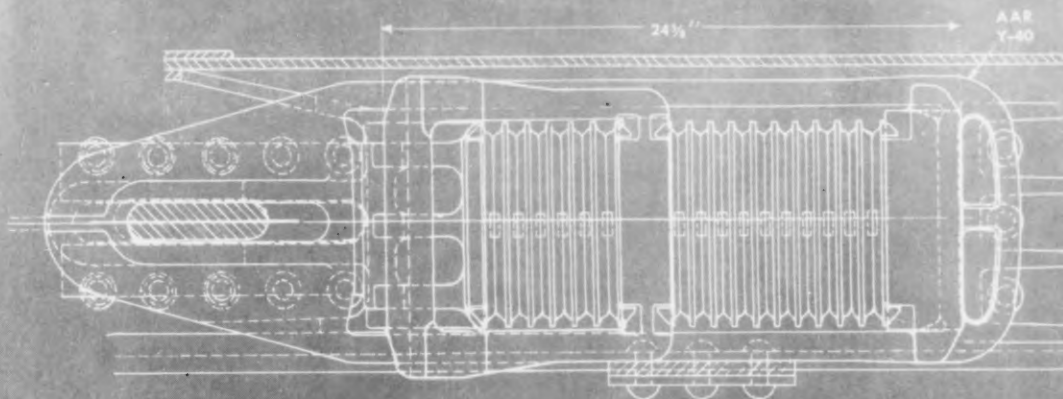
Taper Lock Sprockets

An extension of the Dodge line of Taper-Lock sprockets including 1½, 1¾ and 2 in. pitch sizes has been announced. Users of single strand roller chain will now be able to secure sprockets and bushings for chain sizes from 40 through 160 for immediate installation without delays for re boring, keyseating, drilling and tapping.

According to the manufacturer, these
(Continued on page 98)

NATIONAL designed

Multi-Pad Rubber Draft Gears
to fit AAR Standard Yokes and Standard Construction

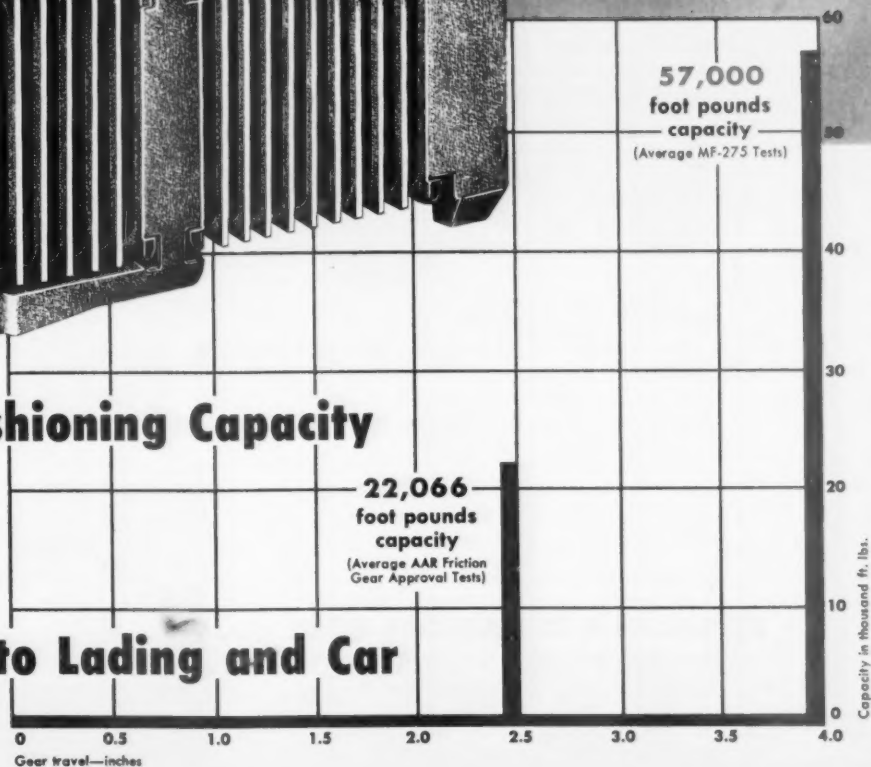


slack free!

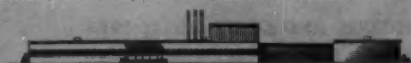
MF-275
Rubber Draft Gear

for Greater Cushioning Capacity

for Protection to Lading and Car



A-960



Technical Center
Cleveland

"Progress through Research"

NATIONAL MALLEABLE and STEEL CASTINGS COMPANY

Cleveland 6, Ohio

COUPLERS • YOKES • DRAFT GEARS • FREIGHT TRUCKS • SHOCKER PACKAGES • JOURNAL BOXES and LIDS



INSURED SAFETY

ON BIG LIFTS

WITH YELLOW STRAND SAFETY BRAIDED SLINGS

Do you want to make sure you have the right safety factor to protect your equipment and personnel? Do you want a sling with increased lifting capacity and with decreased bulk?

The answer to both is a Yellow Strand Braided Safety Sling. These job-matched slings offer a 25% greater safety factor than BBB chain slings, with 45% less bulk and 80% less weight. Compared with alloy chain slings, Yellow Strand Braided Slings give a 20% greater safety factor, 12% less bulk and 66% less weight.

Insure the safety of your workers and equipment—gain handling ease and flexibility—with Yellow Strand Braided Safety Railroad Slings. We can analyze your lifting problems and make a sling for your specific needs. Write for details.

SEND FOR SLING FACTS . . .

"Yellow Strand Braided Safety Slings On The Job" shows types and uses of industrial slings. Write, on your letterhead, for a free copy.

A modified ML-4 Braided Sling is used in lifting a 4-wheel diesel-electric truck weighing 38,000 pounds.

BRODERICK & BASCOM ROPE CO.

4203 Union Blvd. • St. Louis 15, Mo.

SPECIFY

Yellow Strand

FOR SAVINGS . . . SAFETY . . . SPEED-SERVICE

Famous Problems IN RAILROADING



Our engineer friend is overacting a bit, but it seems that his watch was repaired so accurately

that it wouldn't gain or lose a single second in a month. However, the repairman in a spell of absent-mindedness placed the hour-hand on the minute-hand's pinion and vice versa. The result was that the hour hand now traveled 12 times as fast as the minute hand. Friend engineer picked-up the watch just as the repairman set it to the correct time of 6 o'clock and didn't look at it again until a little more than 2 hours later. And then, curiously enough, his watch showed the correct time! What time was it then?

See next month's Spicer Generator Drive advertisement for answer.



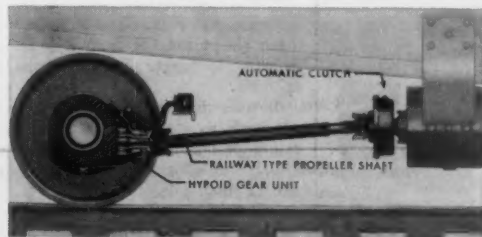
SOLUTION TO PROBLEM FOR MAY

The local reached New York first — by 43.9 minutes. When the first express met the local, the express had covered some distance "x," while the local had covered some shorter distance "y." Then the express traveled the distance "y," while the local covered 1/3 of the distance "x". Since distances traveled in equal times bear the same ratio, $x/y = y/1/3x$. Reduced, $x = y\sqrt{3}$.

We know that the local reaches New York 3 hours after the meeting. The express reaches Baltimore 1 hour after the meeting; and the second express, naturally, takes 1 hour to get back to the meeting place. From that point it has to travel the distance "x," which will take $\sqrt{3}$ as long. The second express, therefore, does not reach New York until 2 and $\sqrt{3}$ hours after the meeting, or 3.731 hours, — 3 hours and 43.9 minutes.

Famous Solutions TO RAILROADING PROBLEMS

New high efficiency in the delivery of steady, economical power to electrical generators is now being obtained by railroads the world around through the use of Spicer Generator Drives.



Spicer Positive Railway Generator Drives can be quickly and economically adapted to new car designs and reconditioning jobs.

The Spicer Railway Generator Drive is manufactured, sold and serviced by

DANA CORPORATION
TOLEDO 1, OHIO

Simple application of long-lived hypoid gear and pinion mounted on a standard axle is the outstanding feature of the Spicer Railroad Generator Drive. It provides a positive, constant drive from the gears through Spicer Universal Joints and Propeller Shaft to the Spicer Automatic Clutch mounted between the generator and the propeller shaft.

Spicer design is precise and correct: proved in millions of automotive power transmission installations made during the past half-century.

Over 10,000 railroad installations have been made to date for nearly 100 railroads. The valuable knowledge and experience gained in making them is available for the asking to those with generator power problems. Write for illustrated literature showing how you may obtain this economical, dependable generator drive service.



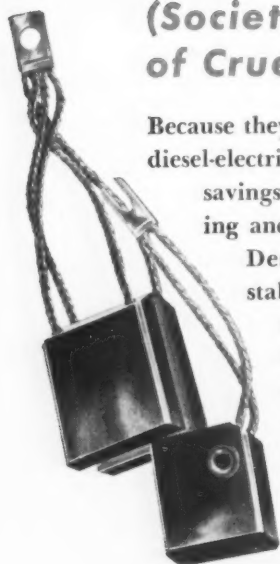


Charter Member of the **S P C C**

**(Society for the Prevention
of Cruelty to Commutators)**

Because they're "kind" to commutators, Stackpole diesel-electric brushes pave the way to worthwhile savings by reducing commutator reconditioning and time out for service.

Designed for good commutation and stable filming qualities even under bad conditions, Stackpole brushes have time and again proved their ability to keep commutators in service for exceptionally long periods . . . and with outstandingly good brush life in the bargain!



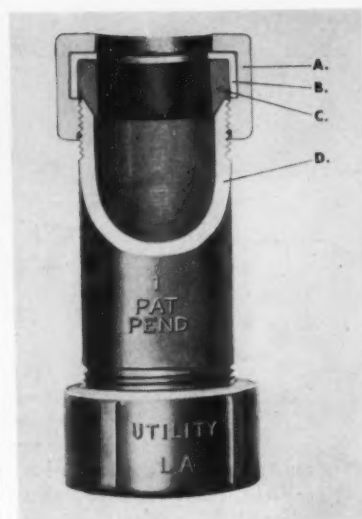
STACKPOLE *diesel-electric* **BRUSHES**

BRUSHES FOR ALL ROTATING ELECTRICAL EQUIPMENT • AVIATION BRUSHES • ELECTRICAL CONTACTS • CARBON-GRAPHITE BEARINGS • CLUTCH RINGS • SEAL RINGS • TROLLEY AND PANTAGRAPH SHOES • WELDING CARBONS • RAIL BONDING MOLDS • FRICTION SEGMENTS • RESISTANCE WELDING AND BRAZING TIPS • CARBON PILES . . . and dozens of other carbon, graphite and molded metal powder products.

STACKPOLE CARBON COMPANY, St. Marys, Pa.

sprockets are compact, have no flanges nor protruding parts. They mount on the shaft quickly and hold with the firmness of a shrunk-on fit. All sprockets in the larger pitches, up through the 26-tooth size are made of high carbon steel and can be hardened. Larger sprockets will be available in close-grained semi-steel.

Dodge Manufacturing Corporation, Mishawaka, Ind.



Compression Pipe Coupling

A compression pipe coupling for connecting small pipe wherever water or other liquids, or gases are piped, eliminates the need for thread cutting or exact pipe fitting. The installer merely inserts the pipe ends into the factory-assembled device and tightens the compression nuts.

Its steel gasket retainers are die-formed and are expanded permanently into the compression nuts. The gaskets, either rubber or neoprene, are inserted into the retainers and are quickly replaced if necessary.

These couplings are supplied in 1/2, 3/4, 1, 1 1/4, 1 1/2 and 2 in. sizes. Regular couplings have sleeve lengths from 2 3/4 in. to 4 in. Shorter or longer sleeve lengths are obtainable.

Sleeves may be had in a choice of metals such as steel-back, galvanized or cadmium plated; stainless steel; Monel; Inconel; brass or bronze. Compression nuts are of ductile iron.

Piston Ring Carrier

This ring carrier for diesel-engine pistons has been designed for 9 in. diameter oil-cooled pistons installed in Alco 244 engines. It features a Ni-Resist insert bonded to the aluminum carrier in the



with **NATIONAL** BRUSHES

TRADE-MARK

Brush selection can never *replace* preventive maintenance — but "National" brushes *do* boost the pay-off obtained from regular, scheduled care of motors, generators and auxiliaries.

"National" brushes for diesel-electric locomotive service incorporate *proved* film-forming ingredients designed to establish and maintain ideal commutator surface. This surface, in turn, is easy on the brushes . . . provides optimum commutation and long brush life.

Don't wait for "problems" to expand your use of "National" brushes! Install them on every change-over and see how profitable preventive maintenance can *really* be!

How good is really good brush performance? . . .

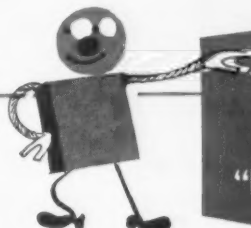
Use "National" brushes and see!

The term "National", the Three Pyramids Device and the Silver Colored Cable Strand are registered trade-marks of Union Carbide and Carbon Corporation

NATIONAL CARBON COMPANY
A Division of Union Carbide and Carbon Corporation
30 East 42nd Street, New York 17, N. Y.

District Sales Offices: Atlanta, Chicago, Dallas, Kansas City,
New York, Pittsburgh, San Francisco

IN CANADA: Union Carbide Canada Limited, Toronto



STOP LOOKING...
START SAVING...
with
"NATIONAL" BRUSHES!

top groove location. These inserts were developed to overcome ring groove wear and are said to have virtually eliminated this problem in industrial pistons ranging in size from 4 to 14 in. in diameter.

Pistons with worn grooves are repaired by removing the old all-aluminum carrier and installing the new carrier with proper interference fit. The new carrier is then welded in place. At present, all work is performed at the suppliers' plant.

Ohio Piston Company, Cleveland 14.

Hose Rack Fire Extinguishing Unit

A compact, self-contained hose rack fire extinguishing unit of the dry chemical type and expressly designed for diesel locomotives has been announced by the C.O. Two Fire Equipment Company, Newark, N. J.

A single pull box release at each hose station renders remote operation and the dry chemical tank valve and nitrogen pressure valve open simultaneously. Hose rack stations are located beside the doors to render fire killing power inside, outside and underneath. Thermostat fire detection in engine space is a separate optional feature.

The heat-shielding dry chemical is a non-conducting, non-abrasive, non-toxic,

finely pulverized powder compound. The pressure cylinder can be mounted in any unit has a 150 lb. capacity, the dry chem-convenient location either vertically or ical tank is 11 in. in dia. and the nitrogen horizontally.



Left: The two main parts of the bender, the hydraulic unit and the frame are put together with a U key. Right: A 90-deg. bend is made in a single setting. No moving of the pipe is necessary.

Conduit Bender

A means of reducing wiring costs by eliminating the purchase of sweep ells and making all types of bends in conduit in sizes up to 4 in. is offered in the form of a hydraulic conduit bender made by Tal Bender, Inc. The bender is operated man-

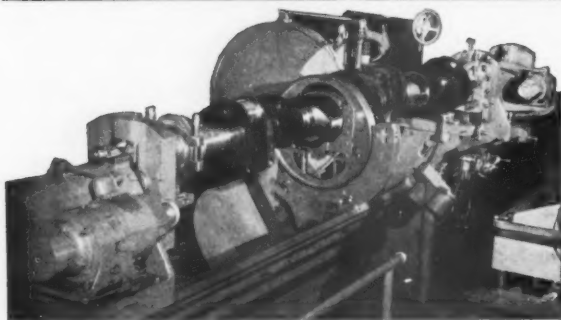
ually and consists of a small hydraulic ram and a light framework.

The framework has adjustable corner formers to accommodate various sizes of conduit and to afford a selection of radii for bends. An assortment of half circle forming shoes is provided to fit each size conduit. The whole unit is small and easily transported from job to job.

The conduit is placed between the forming shoe and the corner formers, and the operating handle of the hydraulic ram is stroked until the proper degree of bend has been made, as shown by the indicator. The release handle causes the ram to return to its original position, ready for the next bend.

Tal Bender, Inc. Milwaukee 2.

CRANKSHAFT GRINDING SERVICE



THE LARGEST CRANKSHAFT GRINDING MACHINE IN THE WORLD USED IN AN INDEPENDENT REPAIR SHOP

- ★ HARD CHROMIUM PLATING SERVICE
- ★ CRANKSHAFT STRAIGHTENING SERVICE
- ★ MAGNAFLUX SERVICE
- ★ CAMSHAFT REPAIR SERVICE

Established 1924 . . . 30 years experience grinding crankshafts! The most complete engine rebuilding shop in the Southwest!

NATIONAL WELDING & GRINDING CO.

2929 CANTON ST.

DALLAS 1, TEXAS

For . . .

ALCO
BALDWIN
EMD
FAIRBANKS-
MORSE
Diesel
Locomotives



Automatic Elec- tric Melting Pots

Automatic electric melting pots that heat and hold soft metals at the proper temperature are available from Westinghouse. They are used in preparing metals for bearings, for tinning and for soldering of electrical connections. The pots are made in three sizes for solder: 150, 750 and

in approximately 16 man-hours

with

Plastinail*

OXYCHLORIDE CEMENT BOX CAR FLOORS

**SAVES TIME, EFFORT AND
MAINTENANCE DOLLARS**

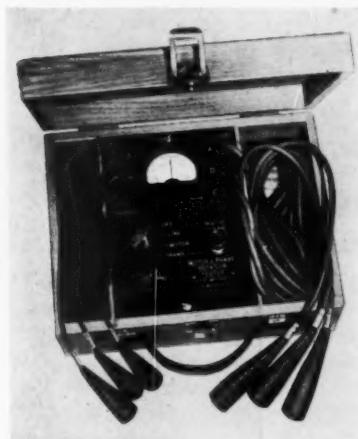
Easy-to-apply Plastinail provides a Class "A" replacement for worn box car decks that can stretch your maintenance dollars and upgrade your entire car pool classification for increased revenue. So easy to apply . . .

1,500 lb. For babbitt melting, they are available in 170, 860 and 1,710-lb. sizes.

Accurate temperature control of molten metal is provided by a thermostat bulb immersed in the metal and protected by a cast iron tube. Heating elements for the 150 to 860-lb. capacity pots consist of spirally wound coils of nickel-chromium wire threaded through ceramic insulator supports to form a flexible band. On the larger pots, the helical coils are spaced and supported by refractory insulators which are bolted together and fastened to the heavy alloy top ring casting. This forms a separate unit which is easily removed as it is not fastened to either the vessel or heating chamber wall.

Light weight, high grade insulating bricks reduce initial heating time and minimize radiation losses. Lack of intense heat and combustion fumes permit locating the pots where most convenient.

Westinghouse Electric Corporation, Pittsburgh.



Motor Rotation And Phase Tester

An addition to the Biddle family of instruments is one for determining the direction of rotation of electric motors before they are connected to the line, and for determining the phase rotation or sequence of energized power circuits.

It provides a positive means for determining which motor leads must be connected to certain conductors of a supply system to insure that the motor will rotate in a prescribed direction when energized. It allows installers to dispense with the temporary hook-up and permanently connect and tape the terminals of a motor upon installation.

The instrument can also be used to determine the polarity of power and instrument transformers, and can be used as a continuity tester in checking electrical circuits.

Housed in an oak case, the set weighs 10 lb. and is supplied complete with 3 line and 3 motor leads which store in the compartments on either side of the instrument panel.

James G. Biddle Company 1316 Arch Street, Philadelphia 7, Pa.

(Continued on page 105)



2. Next, a wire key mesh is put down over the paper and nailed on 6" centers. Large head 1½" roofing nails are used to provide the best mechanical key possible, also serves to strengthen floor and provide a bond between the Plastinail and the old wooden deck. Average time: 8 man-hours.



1. A 15-lb. saturated felt paper is laid over old wooden floor to act as a water-proof barrier and seal off old surface. The saturated felt prevents chemicals, oils, greases absorbed by the old deck from penetrating the re-surfacing material and thereby contaminating the lading. Average time: 1 man-hour.



3. After the above operations, the car is ready for pouring the plastic mixture. A 1" coating of Plastinail is applied over the entire car floor, leveled to proper grade and allowed to dry. After a suitable setting period, the Plastinail is given final troweling, floor sealed and new threshold plates installed. Total time elapsed: approximately 16 manhours.

AVAILABLE AS WOOD • HARD AS STONE • FOOT-SAFE SURFACE

Note these advantages

• **Greater economy** — costs less to install, maintain, clean and repair • **Stronger** — compression strength of 3,500 # p.s.i. — density equal to hard maple • **Available as wood** — withstands impact; deflects without cracking • **Odorless; dustless** — unaffected by heat, cold or moisture • **SAFER** — not slippery; fire-proof; non-sparking • **Smoother** — monolithic surface reduces abrasive damage to bags, cartons — seals deck, makes it ideal for bulk lading • **Double the strength**, triple the CLASS "A" service life of wood alone

*Registered Trade Name of F. E. Schundler & Co., Inc.

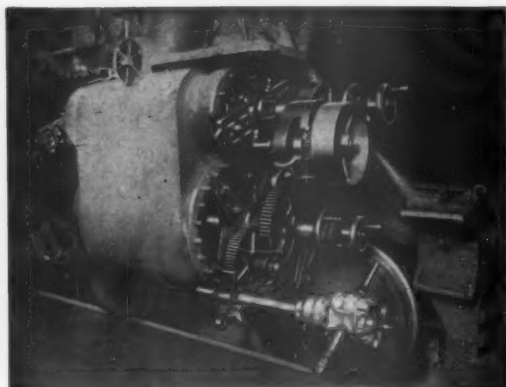
F. E. SCHUNDLER & CO., Inc.

504 RAILROAD STREET • JOLIET, ILLINOIS

MILLIONS OF TONS OF FREIGHT RIDES ON CLASS "A" PLASTINAIL FLOORS

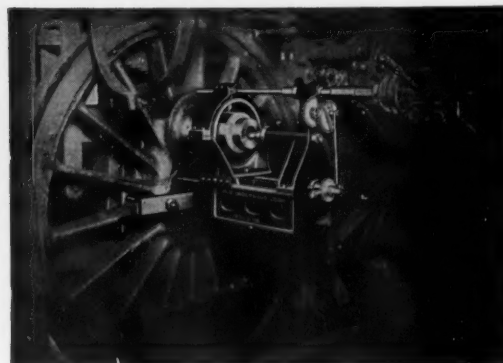
UNDERWOOD PORTABLE MACHINE TOOLS

For Railway Shops and Engine Houses



Left: The Underwood Boring Bar illustrated is designed for rebores all sizes of locomotive cylinders and valve chambers.

Below: The Underwood Portable Crankpin Turning Machine returning crankpin in position.



OTHER UNDERWOOD TOOLS:

Portable Facing Arms
Rotary Planing Machines
Portable Joint Facing Machines
Portable Pipe Benders
Rotary Flue Cleaner

H. B. UNDERWOOD CORPORATION, PHILADELPHIA 23, PA., U. S. A.

NEW AND USED RAILROAD ROLLING STOCK For Immediate Delivery

- 30 Yard Air Side Dump Cars
- Steel Underframe Cupola Caboose Cars
- Tank Cars, Coiled or Non-Coiled
- 50 Ton Stock Cars
- 50-Ton Flat Cars with Fishbelly Center and Side Sills

Also Passenger Equipment: Diesel-Electric and Gasoline Locomotives — Locomotive Cranes

CAR PARTS — NEW and USED

Guaranteed To Meet
AAR and ICC Requirements

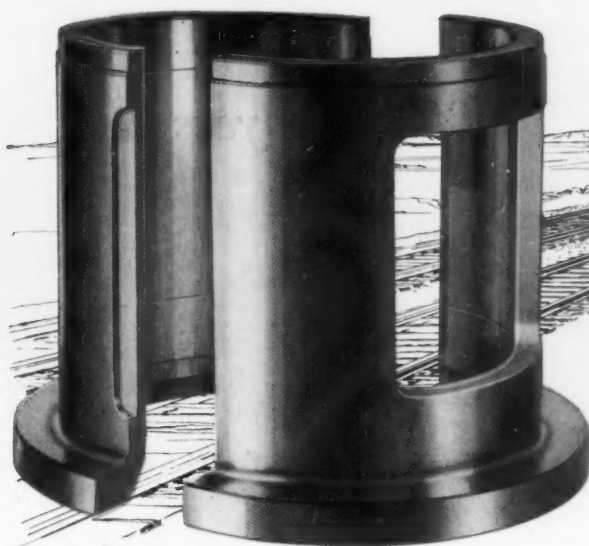
All types of rolling equipment available for immediate delivery from stock.

International Railway Car Co.

RAND BLDG. • BUFFALO, N. Y. • Phone: MOhawk 5820
Write for Complete Listing — Phone for Information



Here's Why You Get LONGER ROAD LIFE



with

Magnus Traction Motor Support Bearings

The extra precision that goes into Magnus Traction Motor Support Bearings means extra trouble-free mileage on the road. It begins with the careful selection and testing of the metal mixes and follows through with the most exacting quality control in every step of manufacture.

Here are some of the outstanding features of these High Mileage bearings:

- **Perfectly Mated Bearing Halves** — precision matched under load to assure uniform wall and flange thickness, parallel ID and OD.
- **Satco Lining Metal**, centrifugally applied, gives greater resistance to wear and load, plus stronger bonds and increased hardness at high temperatures.
- **Interchangeable Double Keeway** — permits bearings to be used interchangeably on either commutator or pinion shaft ends.
- **Precision Finish Boring** to extremely close tolerances on specially designed machines — another contribution to long, trouble-free performance.
- **Hi-Strength Backs** — made from high tin, fine-grained wearing metal mixes that are Magnus-guaranteed.

For complete information, send for your copy of Bulletin No. 6000. Just write a post card or letter to Magnus Metal Corporation, 111 Broadway, New York 6, N. Y.; or 80 E. Jackson Blvd., Chicago 4, Ill.

It Pays to Play Safe!

Use only NEW Magnus Bearings for Replacement Purposes

• New High-Mileage Magnus bearings cost so little because of skilled production methods they can usually be furnished for *less* than the cost of rebuilding worn bearings. And only *new* Magnus bearings give *full* protection to your big investment in Diesel locomotives.



High Mileage

TRACTION MOTOR SUPPORT BEARINGS

...for every type and make of diesel locomotive

MAGNUS METAL CORPORATION *Subsidiary of* **NATIONAL LEAD COMPANY**



"6,000 employees . . ."

A. W. STEUDEL

*President
Sherwin-Williams Company*

"Naturally, we of Sherwin-Williams give complete endorsement to the Payroll Savings Plan. But we feel that mere approval of a national thrift movement that contributes so much to the personal security of our employees and the economic stability of our country is not enough. In our continuing effort to build employee participation in our Plan, we utilize the personal contacts and enthusiasm of our enrolled Payroll Savers. A recent person-to-person canvass by our employees put a Payroll Savings application blank in the hands of every man and woman in our plants and offices. The result, nearly 6,000 serious savers were added to our Payroll Savings Plan."

The personal interest of executives like Mr. Steudel, and the systematic bond purchases of more than 8,000,000 enrolled Payroll Savers are reflected in the following figures:

- In March, 1954, purchases of U.S. Savings Bonds, Series E and H, by *individuals* reached \$474 million, highest March figure in 9 years—a gain of 20% over March, 1953.
- Purchases of E and H Bonds, by *individuals* during the first quarter of 1954, totaled \$1,380 million—the highest for any quarter since 1945.
- The *cash value* of Series E and H Bonds held by *individuals* at the end of March, 1954, was \$37 billion, 175 million—the highest in the thirteen year history of the Savings Bond program.
- Payroll Savers are serious savers: over 75% of the

amount of Series E Bonds that matured since May, 1951—almost \$9 billion—is still being held by individuals under the Treasury's 10 year optional automatic extension plan.

- For the third straight month of 1954, sales of E and H Bonds exceeded maturities and redemptions. The sales excess amounted to \$242 million on March 31—the highest first quarter net since 1950.

If employee participation in your Payroll Savings Plan is less than 50%—or if your company does not have a Payroll Savings Plan, get in touch with Savings Bonds Division, U.S. Treasury Department, Washington, D.C. Your State Director, U.S. Treasury Department, will be glad to help you install a Plan and build employee participation.

The United States Government does not pay for this advertising. The Treasury Department thanks, for their patriotic donation, the Advertising Council and

RAILWAY LOCOMOTIVES AND CARS



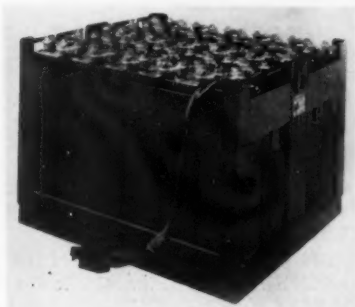
Insulated Terminal For 8 to 4/0 Wire

An insulated terminal for heavy duty wire is shown in the illustration. The manufacturer states that this new terminal known as Ampli-Bond gives a positive and complete bond of the insulation to the terminal sleeve, insures uniform insulation thickness under confined crimping pressure and therefore transmits this pressure evenly to the center of the crimp area.

The insulation is designed to extend a minimum distance beyond the terminal barrel and allows the use of large size wire in restricted areas. A completely separate ring grips the wire insulation, preventing exposure of the conductor during sharp bends and cable fatigue caused by excessive flexing and vibration. This non-conducting ring forms a barrier to foreign objects coming in contact with current carrying members.

Another feature is that the Ampli-Bond terminal tongues are designed with a helical formation to give maximum strength with minimum use of copper. Color coding is used on the terminals for rapid identification of wire sizes. The terminals are applied in one quick operation with the manufacturer's pneumatic hydraulic tool. They are available in a variety of tongue shapes, stud sizes and in both butt and parallel connectors.

Aircraft-Marine Products, Inc., 2100 Paxton street, Harrisburg, Pa.



Smaller Batteries With More Capacity

A new type of storage battery for electric industrial trucks is announced by the Edison Storage Battery Division. It supplies more capacity relative to its size than any Edison nickel-iron-alkaline storage battery heretofore available. It has been developed for use in electrical industrial trucks in which the space available for the battery is limited, especially trucks of the driver-ride sit-down type.

Designated as the MC-type, it affords a means of supplying most trucks of this type with as much as 25 per cent more capacity than other types of Edison batteries can supply, without changing either steering-wheel or pedal heights and without increasing either the length or width of the battery boxes.

Cells of the MC-type battery employ the standard steel-tube and pocket construction of the plates which is among the

major reasons for the durability and long life of Edison batteries. They are also identical in electrical characteristics and ratings. They are rated at the normal five-hour discharge rate, can be charged at full normal rate, and withstand various electrical accidents in the same manner as other Edison cells.

Initially, the MC cell is being produced in six sizes, MC4, MC5, MC6, MC7, MC8 and MC10, with capacities ranging from 285 amp-hr for MC4, to 710 amp-hr for MC10. Standard assemblies range from 10-cell MC4, rated capacity 3.42 kw-hr to 42-cell MC10, rated capacity 35.78 kw-hr.

When assembled in steel cradles, the MC battery has the same length and width as the C type. Its height is 24 3/4 in., compared to 22 1/4 in. for the C type, or 2 1/2 in. greater. Thus when it is substituted for a C type, the battery box need not be lengthened or widened. It may need to be increased in height, but only if its inside clear height is less than 25 in. and thus fails to provide clearance. Lifting ears which turn down when the battery is on the truck are located on the shorter ends of the battery.

Edison Storage Battery Division, Thomas A. Edison, Inc., West Orange, New Jersey.

BIDDLE Instrument News

NEW CONVENIENCE and Protection for MIDGET MEGGER® Insulation Tester

The ever-popular Midget Megger Insulation Tester is packed in a leather case of new design. As with a fine camera case you simply flip back the lid of the case and the instrument is ready for use. The leads are stored in a compartment under the instrument. The Midget Megger Test Set contains its own unfailing source of test current in a hand generator. No dependence on batteries or other power supply.

Ratings up to 50 megohms, 500 volts d-c are available.

Write for BULLETIN 21-85-X.

**Operates
without
Removing
From Case**



**Cases
Available
for Your
Present
Instruments**
\$11.00 EACH



"GOOD COMPANIONS" KIT for RAILROAD ELECTRICAL MAINTENANCE MEN

This handy 6 lb. kit includes:

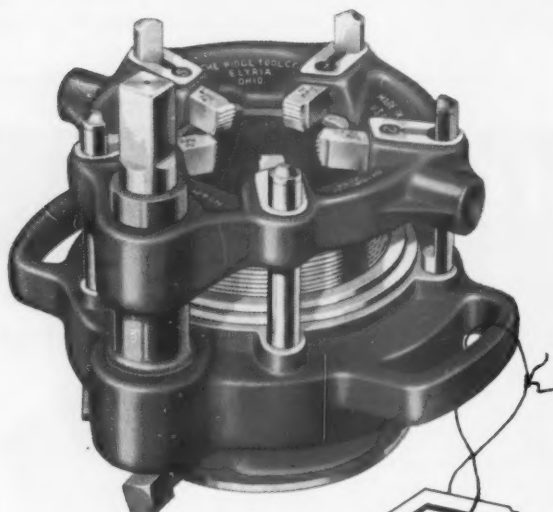
- 1 Midget Megger® Insulation Tester for detecting dirt, moisture and deterioration in advance of failure, or as a trouble-shooter after failures occur.
- 2 Midget Megger® Circuit Testing Ohmmeter for measuring conductor resistance of coils, contacts and relays, and checking continuity of circuit and grounded parts. Get BULLETIN 21-85-X.

JAMES G. BIDDLE CO.

• ELECTRICAL TESTING INSTRUMENTS
• SPEED MEASURING INSTRUMENTS
• LABORATORY & SCIENTIFIC EQUIPMENT

1316 ARCH STREET
PHILADELPHIA 7, PA.

For Easy Pipe Threading 2½" to 4"... it's the 4P **RIGID**

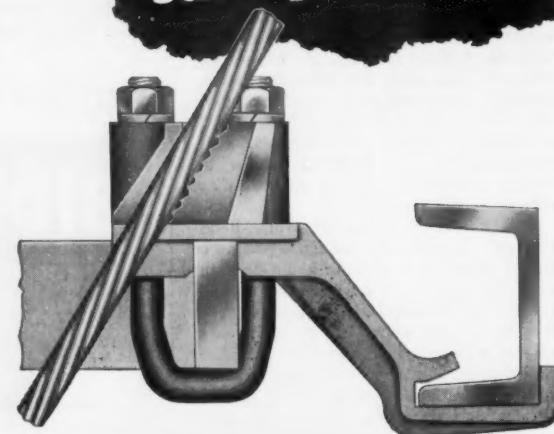


RIGID 4P
is easy to
carry, easy to
put on pipe



Balanced loop handles make it a cinch to carry and swing up on a pipe. Besides, the mistake-proof workholder sets to size before you lift it—only one screw to tighten on pipe. Easy upkeep—drive pinion in oilless bronze bearing; safe enclosed gear. 4 sets of 5 high-speed steel dies, 2½", 3", 3½", 4". Ratchet handle. **RIGID** drive shaft available. Save work—buy 4P at your Supply House.

The Ridge Tool Company • Elyria, Ohio, U.S.A.



gives extra safety
in the brake
danger-zone!

The G. N. Brake Beam Safety Support, through sound engineering, dependable performance and easy installation, can prevent a derail due to brake beam or brake hanger failure.

- THE COMPRESSION AND TENSION MEMBER CONNECTING BRACKET ASSURES PROPER LOCATION OF SUPPORT AT TIME OF APPLICATION AND IN SERVICE.
- Lightweight without sacrificing strength.
- Adjustable to provide proper clearance over bolster.
- No drilling, riveting or welding.
- Easy to apply on loaded or empty cars—NO NEED TO JACK CAR OR REMOVE TRUCKS.
- Wheels can be removed without disturbing supports.
- Attaches to brake beam only.
- To remove brake beam, only one side of support need be detached.
- A.A.R. approved (conditional)

WRITE FOR FULL PARTICULARS

AD NO. 109

OTHER GRIP NUT PRODUCTS



Grip Lock Nut #1

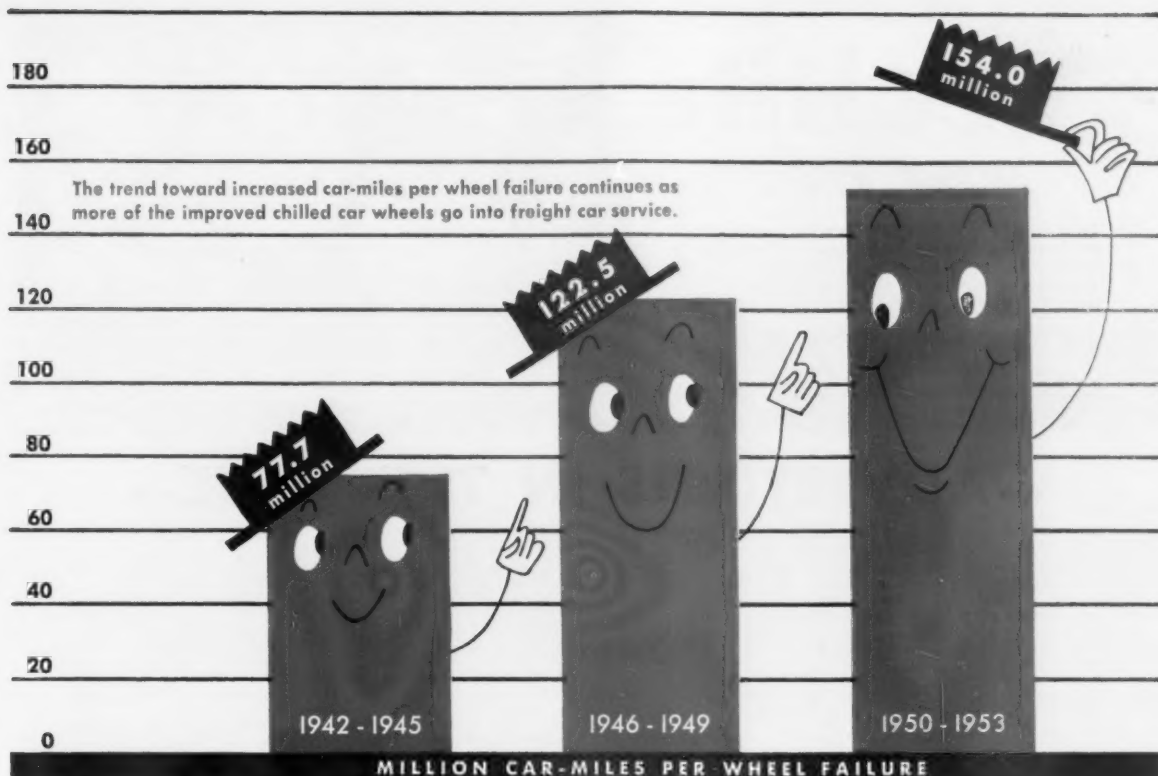
Grip Holding Nut #2

Railroad Gripco Lock Nut

GRIP NUT COMPANY

Serving American Railroads Since 1904

308-P S. MICHIGAN AVE. • CHICAGO 4, ILLINOIS



Another safety performance record for AMCCW Chilled car wheels!



The AMCCW chilled car wheel that established a new high in safety performance in 1953. This design adopted by the AAR in 1950 puts more brackets, thicker, heavier, more continuous flange support and heavier tread into the AMCCW chilled car wheel.

The bar chart tells a story of continuous improvement in the performance of chilled car wheels over the past dozen years. Figures are based on ICC records of car-miles per wheel failure.

1942-1945	77,700,000 car-miles
1946-1949	122,500,000 car-miles
1950-1953	154,000,000 car-miles

What this grouping of records into four-year periods does not show is that the year 1953 was 50% better than any other year since records have been kept, a product performance story that is the more remarkable in view of the increased speeds and increased loadings in modern freight service.

Matter of fact, the whole story is even better. When derailments caused by loose wheels and worn flanges are taken into consideration, **the AMCCW chilled car wheel has the best safety record of any type of wheel in freight car service.**

The record for the freight cars you now equip with new AMCCW chilled car wheels could readily exceed the safety performance illustrated above, because the graphs are based on average performance of old type as well as new improved chilled car wheels.

Low first cost • Low exchange rates
• Reduced inventory • Short haul delivery
• Increased ton mileage • High safety standards • Complete AMCCW inspection
• Easier shop handling



ASSOCIATION OF MANUFACTURERS
OF CHILLED CAR WHEELS

445 North Sacramento Boulevard, Chicago 12, Illinois

Albany Car Wheel Co. • American Car & Foundry Co. • Marshall Car Wheel & Foundry Co.
Southern Wheel (American Brake Shoe Co.) • Griffin Wheel Co. • Pullman Standard Car Mfg. Co.

Lewis seal-tite car bolts

More than 85% of America's Class I railroads use Lewis Seal-tite products. Designed to do a better job . . . to last longer . . . to meet the most exacting specifications. Specify Hot Dip Galvanized, Zinc finish for Double-Life and economy.

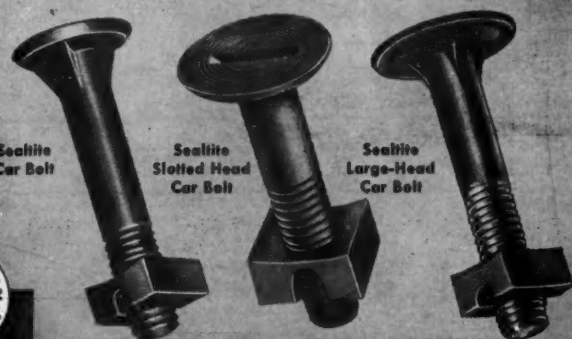
Lewis BOLT & NUT COMPANY
504 Malcolm Ave. S. E.
MINNEAPOLIS 14, MINNESOTA



Seal-tite Car Bolt

Seal-tite Slotted Head Car Bolt

Seal-tite Large-Head Car Bolt



Seal-tite bolts are available with Lok-tite Nut #2 (shown), or std. sq. and hex. nuts

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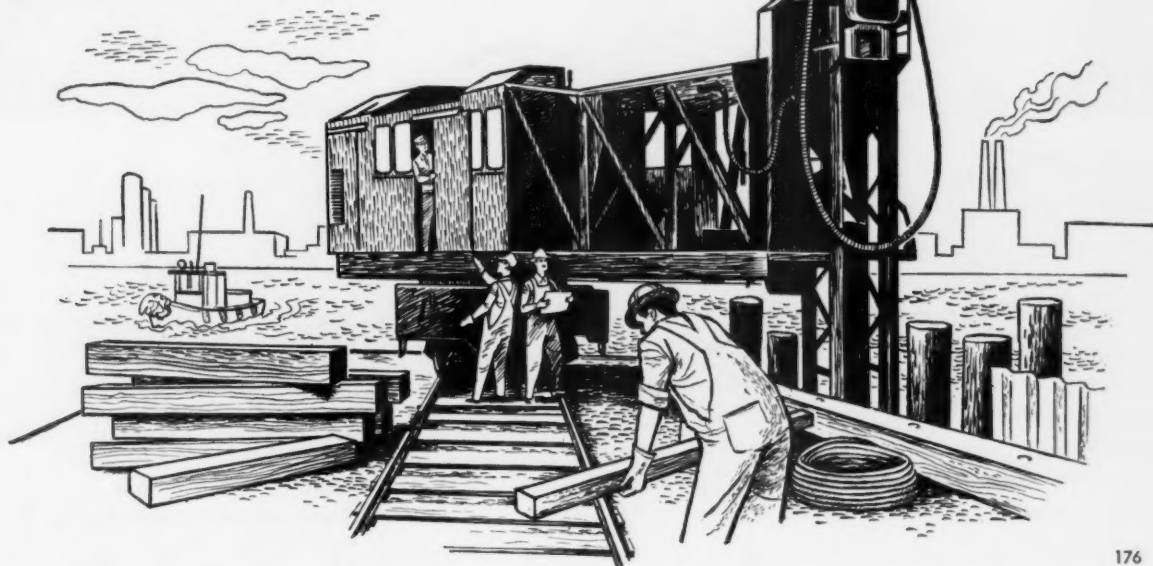
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